DOBOT

# Dobot Magician Lite User Guide


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Shenzhen Yuejiang Technology CO.,Ltd.|China

## Disclaimer

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Before using our product, please thoroughly read and understand the contents of this document and related technical documents that are published online, to ensure that the robotic arm is used on the premise of fully understanding the robotic arm and related knowledge. Please use this document with technical guidance from professionals. Even if follow this document or any other related instructions, damages or losses may happen in the using process. Dobot shall not be considered as a guarantee regarding to all security information contained in this document.

The user has the responsibility to make sure following the relevant practical laws and regulations of the country, in order that there is no significant danger in the use of the robotic arm.

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# Preface

## Purpose

This Document describes the working principle, technical specifications, connection and functions of Dobot Magician Lite, making it easy for users to fully understand and use Magician Lite.

## Intended Audience

This document is intended for:

- Customer Engineer
- Sales Engineer
- Installation and Commissioning Engineer
- Technical Support Engineer

## Change History

| Date | Change Description |
| --- | --- |
| 2022/12/06 | **Added:**<br>1. Added 10Pin communication cable wiring instructions in Chapter 3.<br>2. Added 12V 4Pin interface pin function description in Chapter 4.<br>3. Added AI camera usage tutorial in Chapter 5.<br>**Modified:**<br>Updated the screenshots and instructions of the DobotLab software interface in Chapter 5. |
| 2020/06/08 | The first release |

## Symbol Convention

The symbols that may be found in this document are defined as follows.

| Symbol | Description |
| --- | --- |
| ⚠DANGER | Indicates a hazard with a high level of risk which, if not avoided, could result in death or serious injury |
| ⚠WARNING | Indicates a hazard with a medium level or low level of risk which, if not avoided, could result in minor or moderate injury, robotic arm damage |
| ⚠NOTICE | Indicates a potentially hazardous situation which, if not avoided, can result in robotic arm damage, data loss, or unanticipated result |
| 🕮NOTE | Provides additional information to emphasize or supplement important points in the main text |

# Contents

**1. Security Precautions ..... 1**
1.1 General Security ..... 1
1.2 Precautions ..... 2
**2. Introduction ..... 3**
2.1 Overview ..... 3
2.2 Appearance ..... 3
2.3 Working Principle ..... 3
2.3.1 Workspace ..... 3
2.3.2 Coordinate System ..... 4
2.3.3 Motion Mode ..... 6
2.4 Technical Specifications ..... 8
2.4.1 Technical Parameters ..... 8
2.4.2 Dimensions ..... 9
**3. Robot Connection ..... 11**
3.1 Connecting Cables to Magician Lite ..... 11
3.2 Powering on/off Magician Lite ..... 13
**4. Interface Description ..... 15**
4.1 Magician Lite Interface Description ..... 15
4.2 Magic Box Interface Description ..... 16
4.3 Multiplexed I/O Interface Description ..... 16
**5. Operation ..... 22**
5.1 Introduction on DobotLab ..... 22
5.2 DobotLink Installation ..... 23
5.3 Blockly Programming ..... 25
5.4 AI Camera Tutorial ..... 30
5.4.1 Installing the camera ..... 30
5.4.2 Image recognition ..... 30
5.4.3 Face recognition ..... 34
5.4.4 OCR text/ID card recognition ..... 35
5.5 Python Programming ..... 36
5.6 Writing and Drawing ..... 39
5.6.1 Installing a Writing and Drawing Kit ..... 40
5.6.2 Drawing Operations (Without Sliding Rail) ..... 41
5.6.3 Installing a Sliding Rail Kit ..... 44
5.6.4 Drawing Operations (with a Sliding Rail) ..... 47
5.7 Teaching and Playback ..... 54
5.7.1 Installing a Suction Cup Kit ..... 54
5.7.2 Installing a Gripper Kit ..... 56
5.7.3 Teaching & Playback Operation ..... 57
5.8 Homing ..... 62
5.9 Working in Offline Mode ..... 63

# 1. Security Precautions

This chapter describes the security precautions that should be noticed when using this product. Please read this document carefully before using the robotic arm for the first time. This product needs to be used in an environment meeting design specifications. You cannot remold the product without authorization, otherwise, it could lead to product failure, and even personal injury, electric shock, fire, etc. The installation personnel, operators, teaching personnel, and programmers must read this document carefully and use the robotic arm strictly according to the regulations of this document strictly.

## 1.1 General Security

⚠DANGER

The robotic arm is electrical equipment. Non-professional technicians cannot modify the wire, otherwise, it is vulnerable to injury the device or the person.

The following security rules should be followed when using the robotic arm.

- You should comply with local laws and regulations when operating the robotic arm. The security precautions in this document are only supplemental to local laws and regulations.
- The **DANGER**, **WARNING**, and **NOTICE** marks in this document are only supplemental to the security precautions.
- Please use the robotic arm in the specified environment scope. If not, exceeding the specifications and load conditions will shorten the service life of the product even damage the equipment.
- Before operating and maintaining the robotic arm, the personnel responsible for the installation, operation, and maintenance must be trained to understand the various security precautions and to master the correct methods of operation and maintenance.
- Highly corrosive cleaning is not suited to cleaning the robotic arm. The anodized components are not suitable for immersion cleaning.
- People cannot repair and disassemble the robotic arm without professional training. If there is a problem with the robotic arm, please contact Dobot technical support engineer in time.
- Please comply with the relevant laws to deal with the product which is scrapped, and protect the environment.
- There are small parts in the packing box. Please keep them away from children, to avoid any accidents.
- DO NOT let children play with the robotic arm alone. All processes need to be monitored while running. After processes have finished, please turn off the equipment promptly.
- DO NOT put hands into the workspace of the robotic arm while running, to avoid bruising or pinching.

- Be careful during the robotic arm carrying or installing. Please follow the instructions on the packing box to put down the robotic arm gently and place it correctly in direction of the arrow.
- Commissioning of the incomplete machine is prohibited until it has been installed in a machine and the whole machine complies with the provisions of the Machinery Directive (2006/42/EC).
- It is prohibited to modify or remove the nameplates, instructions, icons, and marks on the robotic arm and the related equipment.
- Please refer to *Magician Lite Quick Start* along with the packing box before using it.

## 1.2 Precautions

- Magician Lite was calibrated at the factory. By default, the coordinate of J1 axis is 0° after Magician Lite moving to the default homing point, i.e. The forearm is in the middle of the front of the base of Magician Lite.
- If the LED indicator turns red after starting up, it indicates that the Magician Lite is at a limited position. Please make the Magician Lite in the workspace.
- Magician Lite will move slowly to the specific position when shutdown. DO NOT put hands into the workspace of Magician Lite while running, to avoid bruising or pinching. Only once the LED indicator completely turns off, Magician Lite can be powered down.
- If the Magician Lite coordinate reading is abnormal during use, please press the forearm unlock button to correct the reading.
- Please turn off Magician Lite completely first before connecting or disconnecting external equipment, such as infrared sensor, color sensor, etc. Otherwise, it causes damage to your device.

# 2. Introduction

## 2.1 Overview

Magician Lite is a multifunctional desktop robotic arm for practical training education, supporting teaching and playback, blockly programming, script programming, writing and drawing, etc. It also supports secondary development by various extensible I/O interfaces in Magic Box, an external controller of Magician Lite.

Magic Box separates motion control algorithm and user tasks, allowing more convenience for programming and creation. Magician Lite supports offline function, and it has 2 controllable power interfaces with 12V, 2 multi-functional communication interfaces, 6 universal IO interfaces, 2 stepper motor interfaces and several I2C interfaces. You can expand a wide range of sensors and related accessories to achieve more functions.

## 2.2 Appearance

Magician Lite consists of a base, rear arm, forearm, and end-effector, etc., as shown in Figure 2.1.

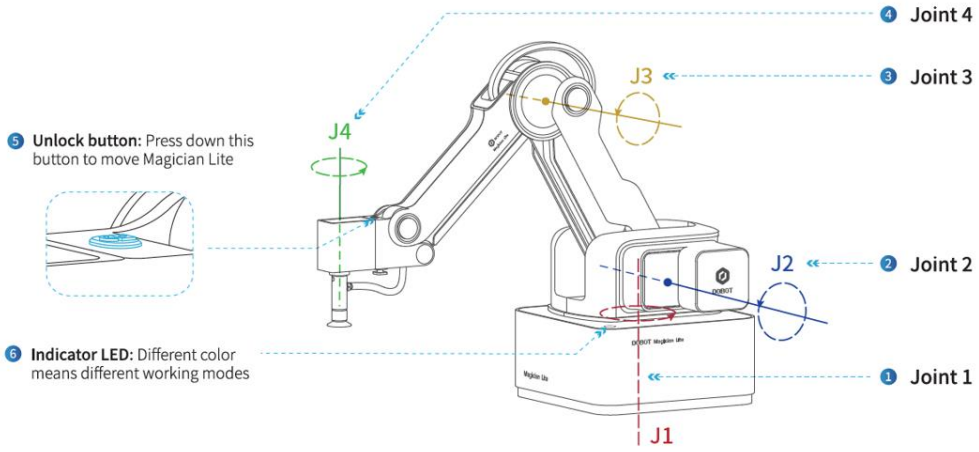



Figure 2.1 Appearance of Magician Lite

## 2.3 Working Principle

This section describes the workspace, principle, size and technical specifications of Magician Lite.

### 2.3.1 Workspace

Figure 2.2 and Figure 2.3 shows the workspace of Magician Lite.

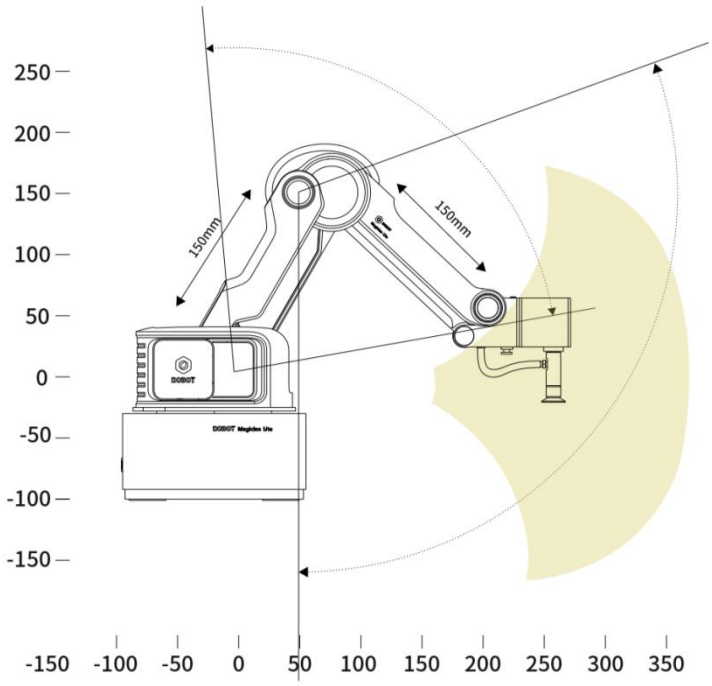



Figure 2.2 Workspace of Magician Lite (1)

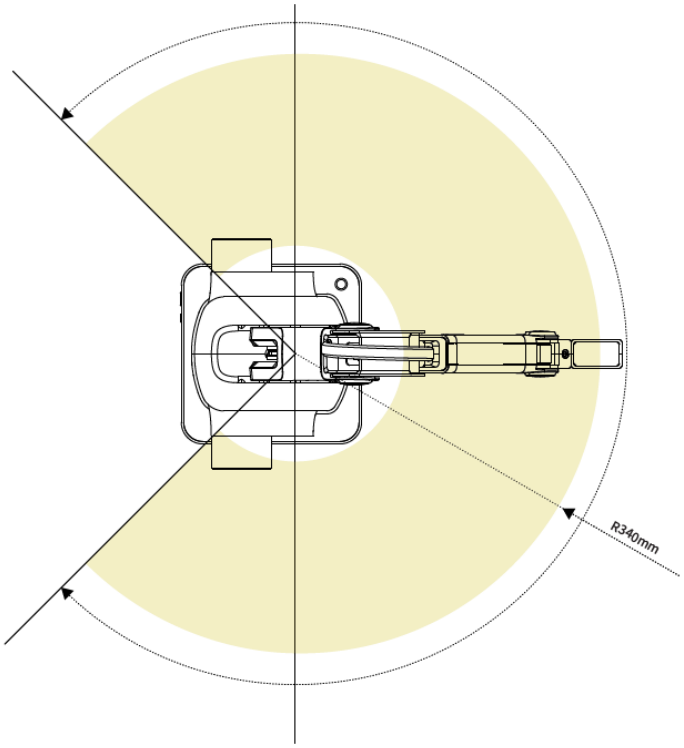



Figure 2.3 Workspace of Magician Lite (2)

### 2.3.2 Coordinate System

Magician Lite has two types of coordinate systems, the joint one and the Cartesian one, as shown in Figure 2.4 and Figure 2.5 respectively.

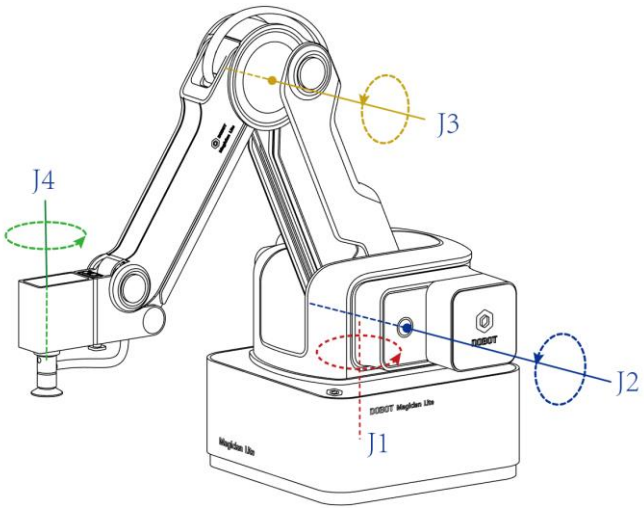



Figure 2.4 Joint coordinate system

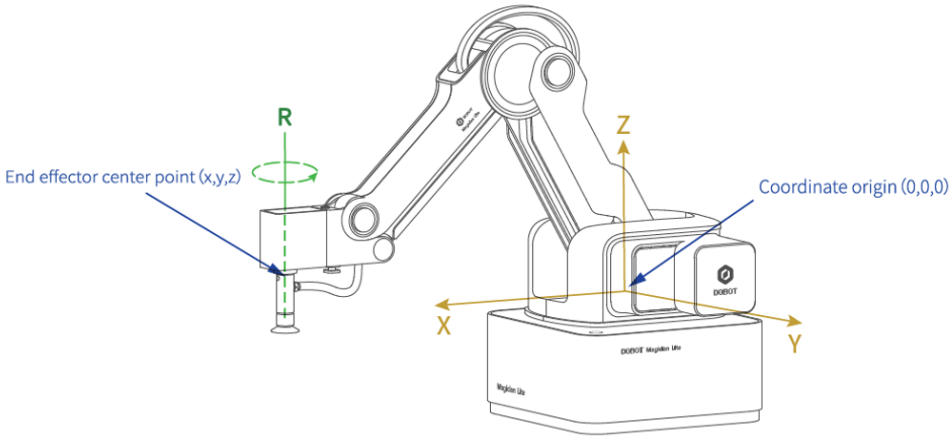



Figure 2.5 Cartesian coordinate system

Joint coordinate system: The coordinates are determined by the motion joints.

- If the end-effector with servo is installed, such as suction cup kit, gripper kit, Magician Lite contains four joints: J1, J2, J3, and J4, which are all rotating joints. The positive direction of these joints is counter-clockwise.

Cartesian coordinate system: The coordinates are determined by the base.

- The origin is the center of the three motors (rear arm, forearm, base).
- The direction of the X-axis is perpendicular to the base forward.
- The direction of the Y-axis is perpendicular to the base leftward.

- The direction of the Z-axis is vertical upward, which is based on the right-hand rule.
- The R-axis is the posture of the servo center relative to the origin of the robotic arm, of which the positive direction is counter-clockwise. The R-axis only exists once the end-effector with servo is installed.

### 2.3.3 Motion Mode

The motion modes of Magician Lite include Jogging, Point to Point (PTP) and ARC.

#### 2.3.3.1 Jogging Mode

Jogging mode is jogging Magician Lite to a point in Cartesian coordinate system or Joint coordinate system when teaching.

Cartesian coordinate system mode:

- Click **X+**, **X-** and Magician Lite will move along X-axis in a positive or negative direction.
- Click **Y+**, **Y-** and Magician Lite will move along Y-axis in a positive or negative direction.
- Click **Z+**, **Z-** and Magician Lite will move along Z-axis in a positive or negative direction.
- Click **R+**, **R-** and Magician Lite will rotate along R-axis in a positive or negative direction.

⚠NOTICE

If the end-effector with servo is installed on the Magician Lite, the R-axis will move together with Y-axis to make sure that the terminal posture relative to the origin stays constant.

Joint coordinate system mode:

- Click **J1+**, **J1-** and control the base motor to rotate in a positive or negative direction.
- Click **J2+**, **J2-** and control the Rear Arm motor to rotate in a positive or negative direction.
- Click **J3+**, **J3-** and control the Forearm motor to rotate in a positive or negative direction.
- Click **J4+**, **J4-** and control the servo to rotate in a positive or negative direction.

#### 2.3.3.2 Point to Point (PTP)

PTP mode, which means point to point movement, supports MOVJ, MOVL and JUMP. The trajectory of playback depends on the motion mode.

- MOVJ: Joint movement. From point A to point B, each joint will run from an initial angle to its target angle, regardless of the trajectory, as shown in Figure 2.6.

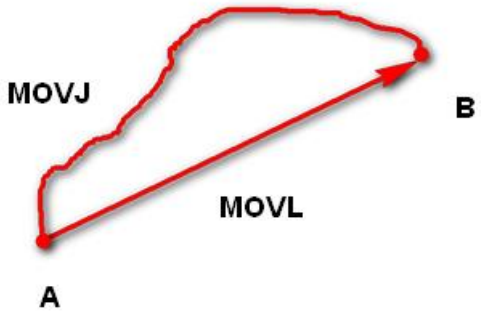



Figure 2.6 MOVL/MOVJ mode

- MOVL: Rectilinear movement. The joints will perform a straight line trajectory from point A to point B, as shown in Figure 2.6.
- JUMP: From point A to point B, the joints will move in MOVJ mode, of which the trajectory looks like a door, as shown in Figure 2.7.
  1. Move up to the lifting Height in MOVJ mode.
  2. Move horizontally to a point above B by Height.
  3. Move down to point B.


Figure 2.7 JUMP mode

#### 2.3.3.3 ARC

The trajectory of ARC mode is an arc, which is determined by three points (the current point, any point on the arc and the end point), as shown in Figure 2.8.

⚠NOTICE

In ARC mode, it is necessary to confirm the three points with other motion modes, and the three points cannot be in a line.

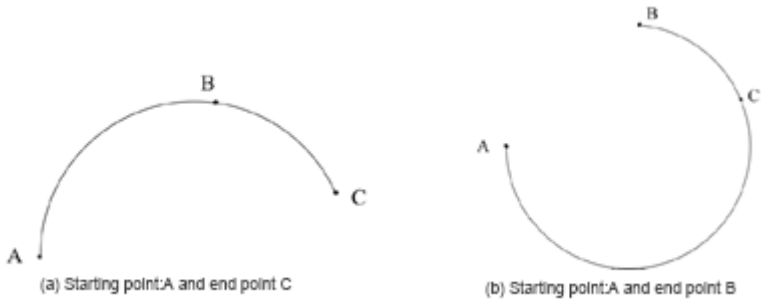



Figure 2.8 ARC mode

#### 2.3.3.4 Application Scenarios

The application scenario depends on the trajectory in a motion mode, as shown in Table 2.1.

Table 2.1 Application scenario

| Motion mode | Application scenario |
|---|---|
| MOVL | If the trajectory of playback is required as a straight line, you can choose MOVL |
| MOVJ | If the trajectory of playback is not required but high speed is required, you can choose MOVJ |
| JUMP | If the movement of two points is required to lift upwards by amount of height, such as sucking up, grabbing, you can choose JUMP |
| ARC | If the trajectory of playback is required as an arc, you can choose ARC |

## 2.4 Technical Specifications

### 2.4.1 Technical Parameters

Table 2.2 Magician Lite technical parameters

| Name | Magician Lite | |
|---|---|---|
| Maximum payload | 250g | |
| Maximum reach | 340mm | |
| Motion range | J1 | -135°~135° |
| | J2 | -5°~80° |
| | J3 | -10°~85° |
| | J4 | -145°~145° |
| Repeated positioning accuracy | ±0.2 mm | |
| Power supply | 100V~240V AC, 50/60Hz | |

| | |
|---|---|
| Power input | 12V/5A DC |
| Communication | USB virtual serial /serial |
| Software | DobotLab |
| Working temperature | -5°C~+45°C |

Table 2.3 Magic Box technical parameters

| | |
|---|---|
| Name | Magic Box |
| Control chip | ARM 32-bit Cortex-M4 |
| Frequency | 168 MHz |
| Power supply | 100V~240V AC, 50/60Hz |
| Power in | 12V/5A DC |
| Working Temperature | -5°C - 45°C |
| Capacity | 60W Max |
| Communication mode | USB virtual serial/serial/Bluetooth |
| Program language | MicroPython |
| Software | DobotLab |
| Weight | 98g |
| Size | 95 mm×80 mm×21.5 mm |
| Power interface | 4 PIN, 12V/3A DC |
| Multifunctional Communication Interface | 10PIN, serial port communication interface |
| General I/O expand interface | Green port, 4PIN, 3.3V/5V-IO, 5V/1A-VCC, multiplexing interface<br>Self-define I/O, AD, PWM output, I2C etc. |
| Stepper motor expand Interface | Yellow port, 4PIN, 12V 1A |
| 12V power interface | Red port, 2PIN, 12V, 3A max |
| PWM | Value range: 20Hz~100KHz |
| ADC | Value range: 0V~5V<br>Accuracy: 12bit |

### 2.4.2 Dimensions

Figure 2.9 shows the size of Magician Lite and Figure 2.10 shows the size of the end mounting

hole.

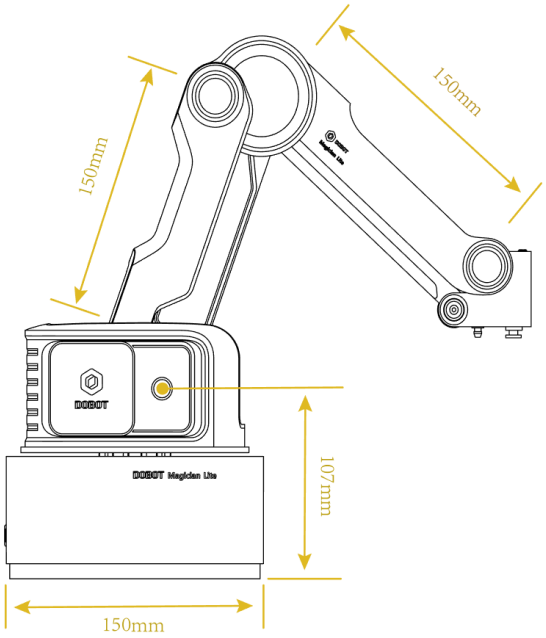



Figure 2.9 Size of Magician Lite

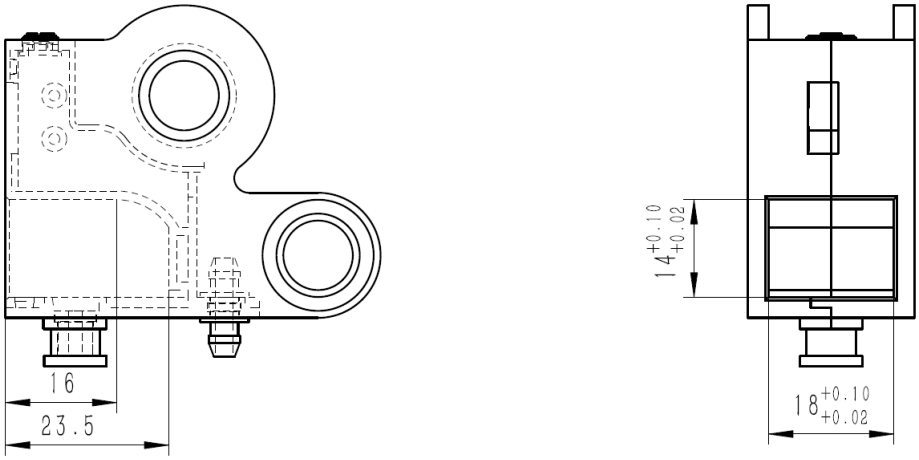



Figure 2.10 Size of end mounting hole

# 3. Robot Connection

This section describes how to connect Magician Lite, and power it on/off.

## 3.1 Connecting Cables to Magician Lite

When using Magician Lite without Magic Box, connect Magician Lite as below.

**Step 1** Connect Magician Lite to your computer with a USB cable, as shown in Figure 3.1.


Figure 3.1 Connect Magician Lite to your computer

**Step 2** Connect the power adapter to power interface on Magician Lite, as shown in Figure 3.2.


Figure 3.2 Connect Magician Lite to the electrical outlet

When using Magician Lite with Magic Box, connect the devices as below.

**Step 1** Connect Magician Lite and Magic Box with a 4PIN power cable and a 10PIN communication cable, with 4Pin power cable connected to **12V** power interface and 10Pin communication cable connected to **Communication1** interface.


Figure 3.3 Connect Magician Lite to Magic Box

⚠NOTICE

When connecting the 10PIN communication cable, you need to pay attention to align the raised part of the plug with the groove on the interface to avoid reverse insertion.

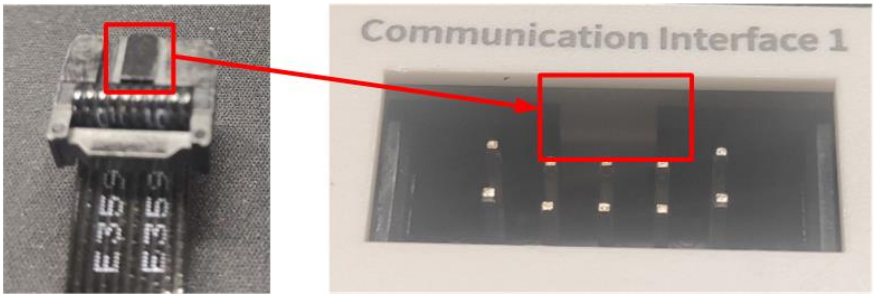



图 3.1 Connect 10PIN communication cable

**Step 2** Connect Magic Box and your computer with a USB cable.


Figure 3.4 Connect Magician Lite to electrical outlet

**Step 3** Connect the power adapter to Magic Box.

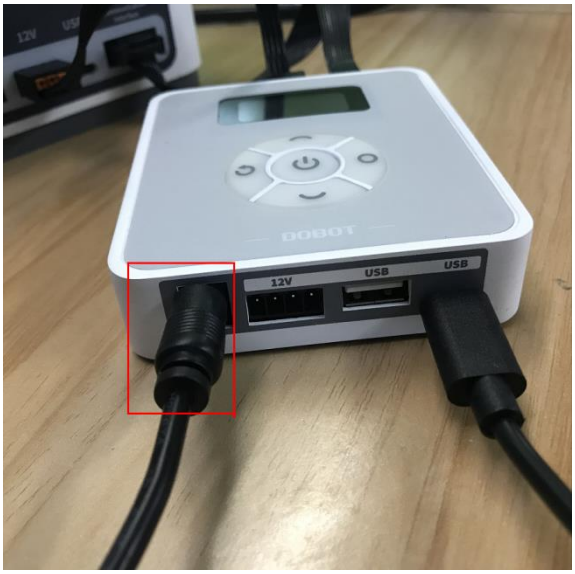



Figure 3.5 Connect power adapter

## 3.2 Powering on/off Magician Lite

- **Power on**: Press the power button on Magician Lite or Magic Box, as shown in Figure 3.6. Once Magician Lite is powered on, all the stepper motors will be locked. You will hear a short beep sound, and the LED indicator turns green. Now Magician Lite is powered on.

Figure 3.6 Power on Magician Lite

⚠NOTICE

If the LED indicator is red after you power on Magician Lite, it means that Magician Lite reaches its limited position. To go back to the workspace, press and hold the **Unlock** button on the Forearm to move Magician Lite to another desired position After releasing the button the LED indicator turns green.

- **Power off**: When the LED indicator is green, press the power button to turn off Magician Lite. In this case, the forearm moves slowly to the rear arm while the angle between them becomes small. Finally, the two arms reach a specific position.

⚠WARNING

Watch your hand during the shutdown process.

# 4. Interface Description

## 4.1 Magician Lite Interface Description

The interfaces of Magician Lite are located on the back of the base. Figure 4.1 shows the interfaces on the back of the base, and Table 4.1 lists the description on the interfaces.

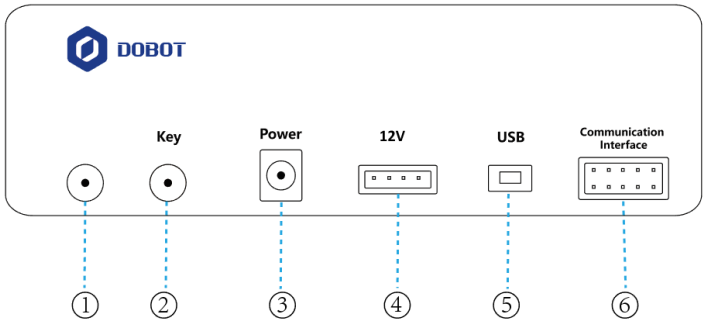



Figure 4.1 Interfaces in the base

Table 4.1 Interface description

| No. | Description |
|---|---|
| 1 | Power switch<br>• Short press: Power on Magician Lite<br>• Long press (>3s): Power off Magician Lite |
| 2 | Key<br>• Short press: Start running playback program in offline mode. For details about offline mode, refer to 5.9 Working in Offline Mode<br>• Long press (>2s): Start homing procedure. For details about homing, refer to 5.8 Homing |
| 3 | Power interface: Connect to power adaptor |
| 4 | 12V power interface: Supply power to Magician Lite<br>The 4 pins from left to right are external charging positive, GND, 12V, ON/OFF control |
| 5 | USB: Connect Magician Lite and PC |
| 6 | 10PIN communication interface: Serial communication. For pin definitions, see 4.3 Multiplexed I/O Interface Description<br>When wiring, pay attention to align the raised part of the plug with the groove on the interface to avoid reverse insertion |

The LED indicator is located on the base, Table 4.2 lists the description on its status.

Table 4.2 LED indicator description

| State | Description |
|---|---|
| Green on | Magician Lite works normally |
| Yellow on | Magician Lite is in the starting status |
| Blue on | Magician Lite is in the offline mode |
| Blue flashing | Magician Lite is running homing procedure |
| Red on | • Magician Lite is at the limited position<br>• An alarm is not cleared |

## 4.2 Magic Box Interface Description

The Magic Box interface consists of 24 I/O multiplexing interfaces as well as communication interfaces that connect sliding rail, conveyor belts, joystick, sensors, etc., as shown in the figure below. The pin definition of the 12V power interface is the same as that of Magician Lite.

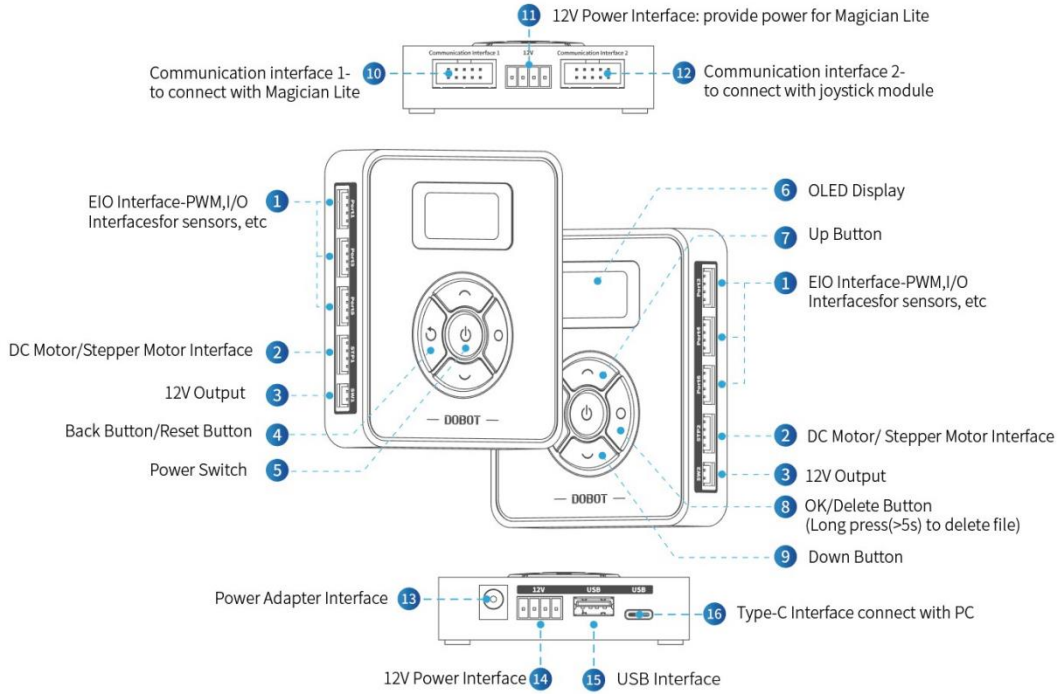



Figure 4.2 Magic Box interfaces

## 4.3 Multiplexed I/O Interface Description

The addresses of the I/O interfaces in Magic Box are unified. Most of I/O interfaces have multiple functions to control the peripheral equipment.

Figure 4.3 shows the communication interface of Magic Box, and Table 4.3 lists the description on multiplexed I/O.

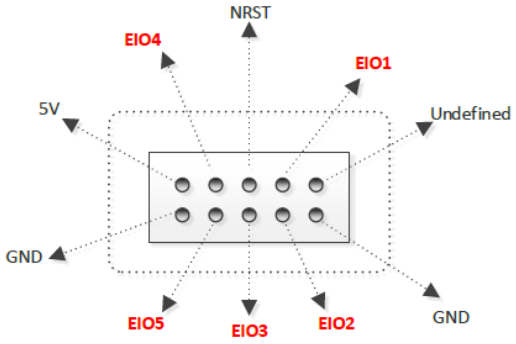



Figure 4.3 Communication Interface 1

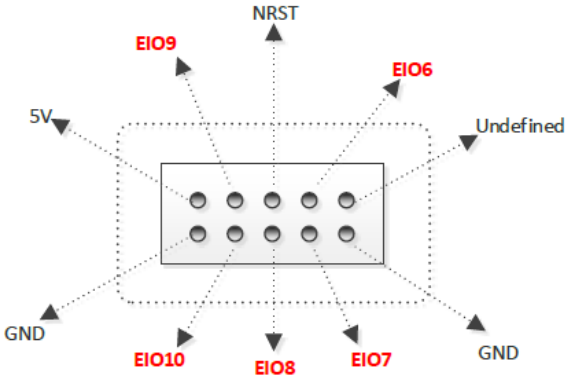



Figure 4.4 Communication Interface 2

Table 4.3 Magic Box multiplexed I/O description

| Interface | Pin | Description | Level Output | PWM | Level Input | ADC | Whether Pulling |
|---|---|---|---|---|---|---|---|
| Communication Interface 1 | undefined | - | - | - | - | - | - |
| | GND | ground | - | - | - | - | - |
| | EIO1 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | EIO2 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | Reset | Firmware reset | 3.3V_10mA output | | 3.3V_10mA input | | Pull up 430R to 3.3V |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | EIO3 | General I/O interface | 3.3V_10mA output | - | 3.3V_10mA input | - | Pull up 10K to 3.3V |
| | EIO4 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | EIO5 | General I/O interface | 3.3V_10mA output | | 3.3V/5V_10 mA input | - | No pulling |
| | 5V | power | 5V/1A output | - | - | - | - |
| | GND | ground | - | - | - | - | - |
| Communication Interface 2 | undefined | - | - | - | - | - | - |
| | GND | ground | - | - | - | - | - |
| | EIO6 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | EIO7 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | Reset | Firmware reset | 3.3V_10mA output | - | 3.3V_10mA input | - | Pull up 430R to 3.3V |
| | EIO8 | General I/O interface | 3.3V_10mA output | - | 3.3V_10m input | - | Pull up 10K to 3.3V |
| | EIO9 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | EIO10 | General I/O interface | 3.3V_10mA output | - | 3.3V/5V_10 mA input | - | No pulling |
| | 5V | power | 5V/1A output | - | - | - | - |
| | GND | ground | - | - | - | - | - |

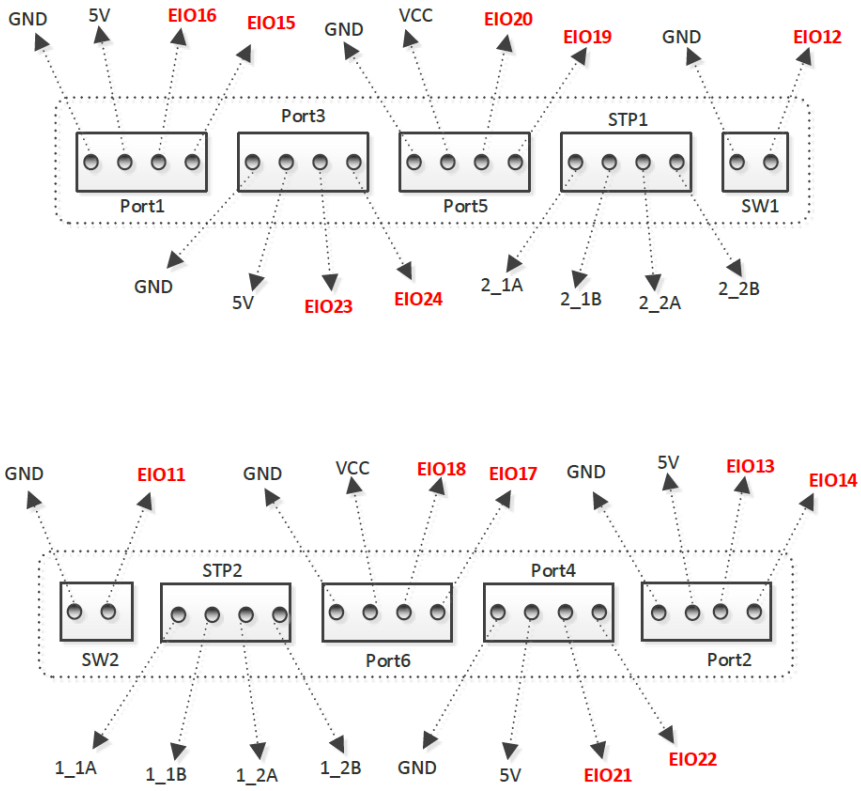



Figure 4.5 Peripheral interface

Table 4.4 Peripheral multiplexed I/O description

| Interface | Pin | Description | Level Output | PWM | Level Input | ADC | Whether Pulling |
|---|---|---|---|---|---|---|---|
| SW1 | EIO12 | Controlled power | 8V~12.6V_3A output | - | - | - | - |
| | GND | Ground | - | - | - | - | - |
| SW2 | EIO11 | Controlled power | 8V~12.6V_3A output | - | - | - | - |
| | GND | Ground | - | - | - | - | - |
| STP1 | 2_1A | - | 8V~12.6V/0.9A output | - | - | - | - |
| | 2_1B | | | - | - | - | - |
| | 2_2A | | | - | - | - | - |
| | 2_2B | | | - | - | - | - |
| STP2 | 1_1A | | | - | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1_1B | | | - | - | - | - |
| | 1_2A | | | - | - | - | - |
| | 1_2B | | | - | - | - | - |
| Port1 | GND | Ground | - | - | - | - | - |
| | 5V | Power | 5V/1A | - | - | - | - |
| | EIO16 | General I/O interface | 3.3V_10m output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| | EIO15 | General I/O interface | 3.3V_10m output | - | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| Port2 | GND | Ground | - | - | - | - | - |
| | 5V | Power | 5V/1A | - | - | - | - |
| | EIO13 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| | EIO14 | General I/O interface | 3.3V_10mA output | - | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| Port3 | GND | Ground | - | - | - | - | - |
| | 5V | Power | - | - | - | - | - |
| | EIO23 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | No pulling |
| | EIO24 | General I/O interface | 3.3V_10mA output | - | 3.3V_10mA input | √ | No pulling |
| Port4 | GND | Ground | - | - | - | - | - |
| | 5V | Power | - | - | - | - | - |
| | EIO21 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | No pulling |
| | EIO22 | General I/O interface | 3.3V_10mA output | - | 3.3V_10mA input | √ | No pulling |
| Port5 | GND | Ground | - | - | - | - | - |
| | 5V | Power | 5V/1A output | - | - | - | - |
| | EIO20 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| | EIO19 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| Port6 | GND | Ground | - | - | - | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 5V | Power | 5V/1A output | - | - | - | - |
| | EIO18 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |
| | EIO17 | General I/O interface | 3.3V_10mA output | √ | 3.3V_10mA input | - | Pull up 51K to 3.3V |

# 5. Operation

## 5.1 Introduction on DobotLab

Dobot Magician Lite has multiple functions including teaching and playback, writing and drawing, blockly programming, script control, etc., which can be realized through DobotLab, an integrated software platform specially designed for artificial intelligence (AI) education. You can enter DobotLab through https://dobotlab.dobot.cc/.

The main interface of DobotLab is shown in Figure 5.1, and its specific modules are described in Table 5.1.

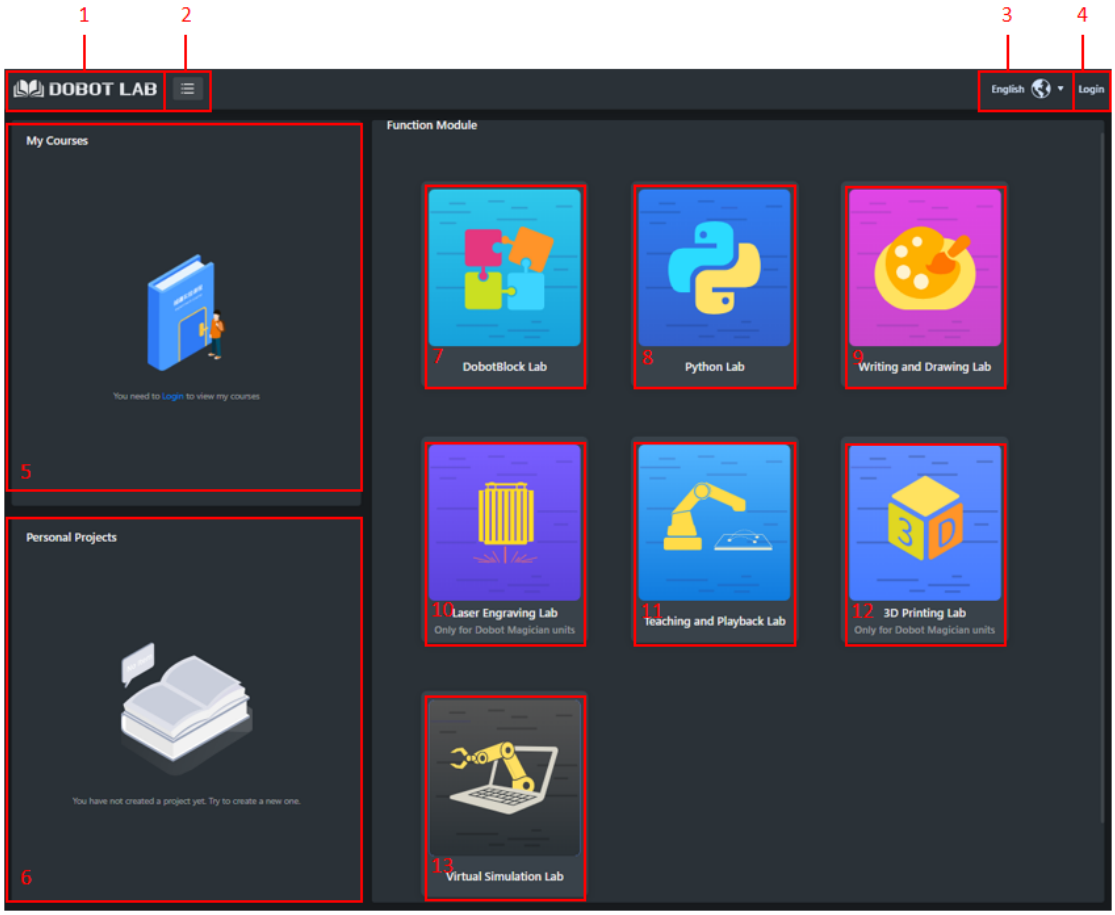



Figure 5.1 The function modules on the DobotDobotLab page

Table 5.1 The function modules on the DobotLab page

| No. | Modules | Description |
|---|---|---|
| 1 | Main page | Click to return DobotLab main page |
| 2 | Menu | Currency: View the guidance for the main page<br>Help: View and download documents related to DobotLab<br>Feedback: Enter your feedback about using DobotLab<br>About: View the basic information of DobotLab |

| No. | Modules | Description |
|---|---|---|
| 3 | Language | Choose a language (Chinese or English) |
| 4 | Login | It supports new user registration. A registered user can log in using the account and password |
| 5 | My Course | Provide free online courses |
| 6 | Personal Works | View and edit the saved project |
| 7 | DobotBlock Lab | Control the Dobot Magician Lite using blockly programming |
| 8 | Python Lab | Control the Dobot Magician Lite using the script commands |
| 9 | Writing and Drawing Lab | Control the Dobot Magician Lite to write and draw |
| 10 | Laser Engraving Lab | Engrave a bitmap image on an object using a laser (only for Dobot Magician) |
| 11 | Teaching and Playback Lab | Teach the Dobot Magician Lite how to move and then record the movement to make Dobot Magician Lite accomplish the recorded movements |
| 12 | 3D Printing Lab | Perform 3D printing (only for Dobot Magician) |
| 13 | Virtual Simulation Lab | Simulate robot movements through programming, combined with a virtual scene and robot model |

📖NOTE

DobotLink is the driver software of DobotLab hardware devices, which can achieve firmware upgrading and machine calibration. You need to install and run DobotLink before using the hardware devices. For details, see 5.2DobotLink.

## 5.2 DobotLink Installation

As DobotLink is the driver software of DobotLab hardware devices, you need to install and run DobotLink before using the hardware devices. When DobotLab is started, if DobotLink is not installed or started, the “DobotLink is not started” window will be displayed, as shown below.


Figure 5.2 Start DobotLink

If you do not download DobotLink, click Download DobotLink , and install it as prompted.

If you have downloaded DobotLink, click Start . Now you will see two pop-up windows: "DobotLink failed to start" and "Open DobotLink?", as shown below.

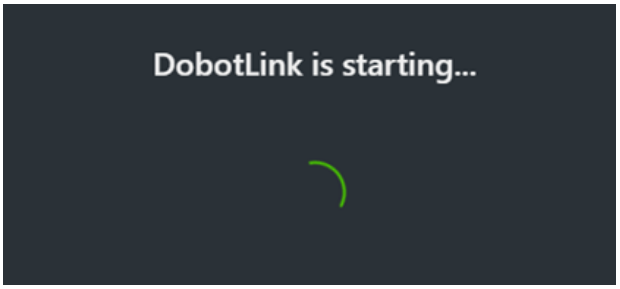



Figure 5.3 DobotLink failed to start

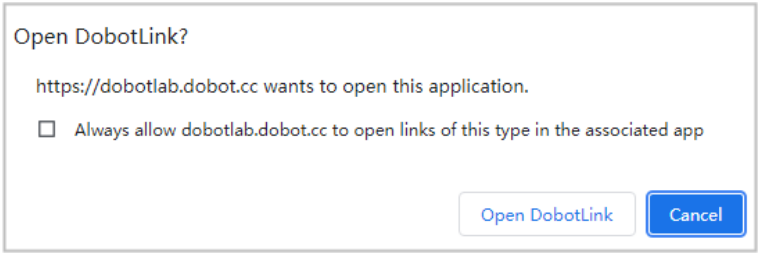



Figure 5.4 Open DobotLink

You need to click **Open DobotLink**. Now "DobotLink started successfully" is displayed.

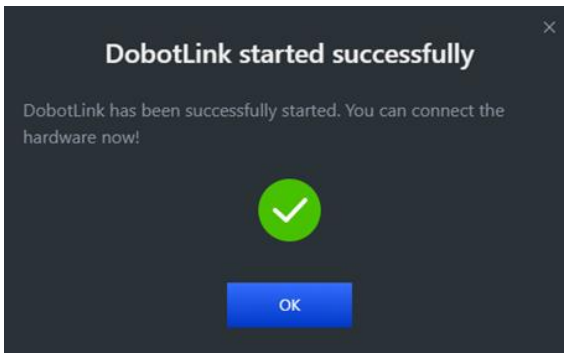



Figure 5.5 DobotLink started successfully

## 5.3 Blockly Programming

DobotBlock Lab is specially designed for beginners in programming. You can program by dragging blocks to control the movement of Dobot Magician Lite.

**Prerequisites**

Dobot Magician Lite has been powered on, and connected to DobotLab.

**Procedure**

**Step 1** Click  in the main page of DobotLab to enter DobotBlock Lab.

**Step 2** Click  . Select **Magician Lite** on "Choose a Device" page, as shown below.

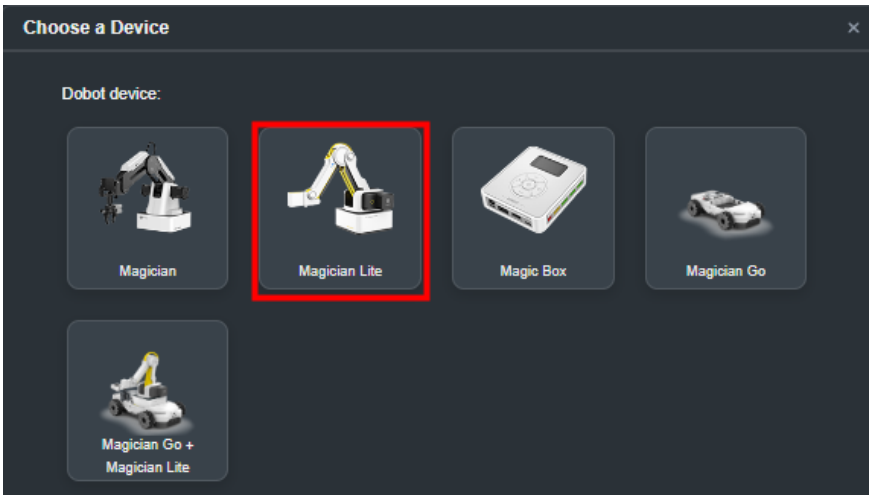
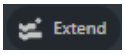



Figure 5.6 Choose Magician Lite

**Step 3** (optional) Click  on the left-bottom corner of block area to enter "Choose an Extension" page, as shown below. Select corresponding extensions according to your needs, and click **Add extension** for direct calling when you program. For details about the AI camera, see 5.4 AI Camera Tutorial.

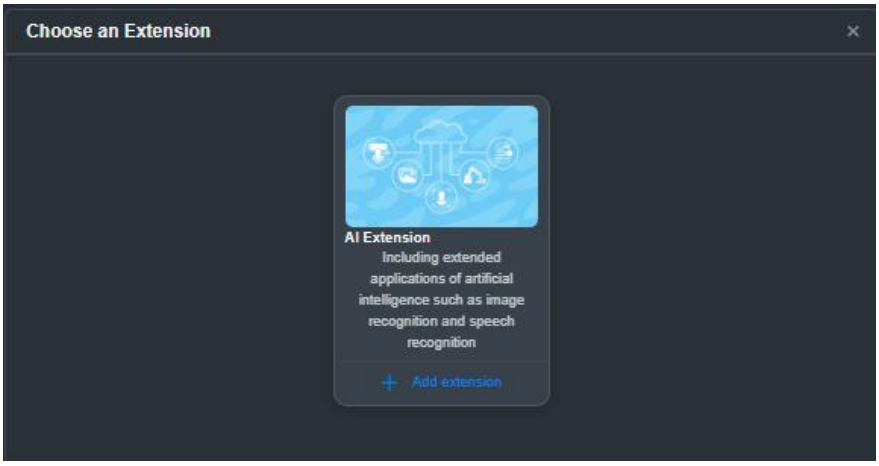



Figure 5.7 Add an extension

NOTE

If you need to connect Magic Box when using Magician Lite, choose **Magic Box** in Step 2 after clicking  . In addition, you need to choose **Magician Lite** in Step 3, as shown below.

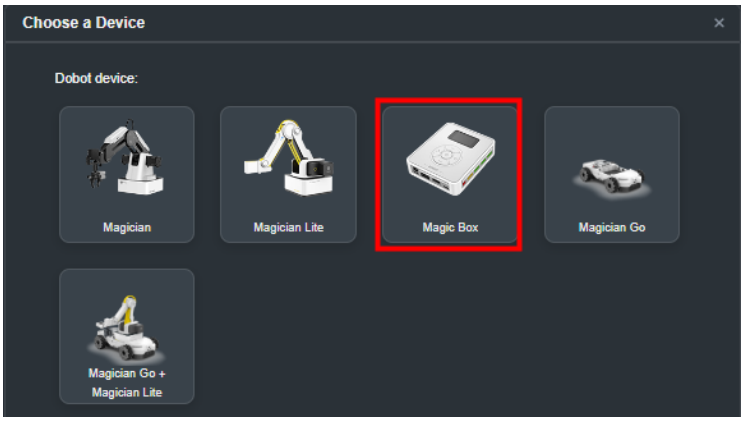



Figure 5.8 Choose Magic Box

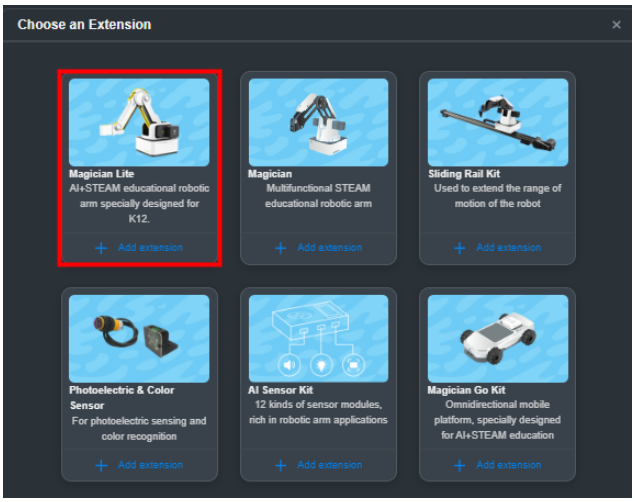



Figure 5.9 Add Magician Lite

**Step 4** Select **Magician Lite** (or **Magic Box**) on Control area, then click  .

**Step 5** Click **Connect**, as shown below.

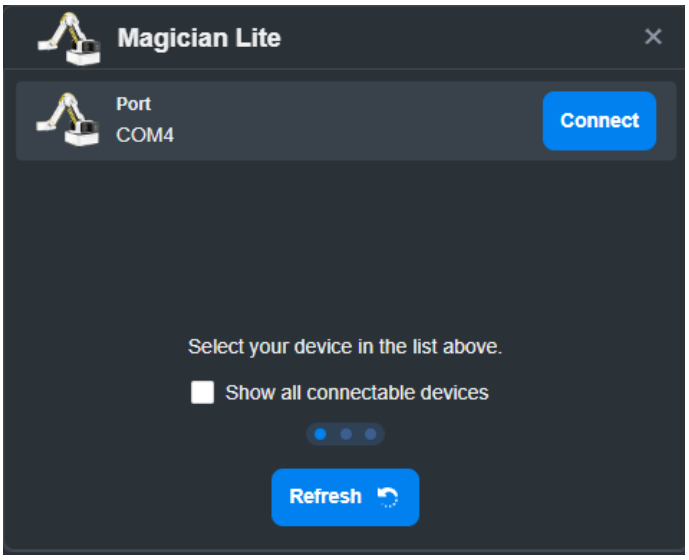
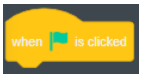



Figure 5.10 Connect device

Now the Dobot Magician Lite is successfully connected to DobotLab.


Figure 5.11 Device connected

**Step 6** After connecting Magician Lite and DobotLab, you can program in the code area.

- Set parameters corresponding to each block based on actual requirements.
- The program written with blocks requires triggering conditions to run. Therefore, you need to select a command from the event block as the triggering condition. For example, 

means the program starts to run once you click  .

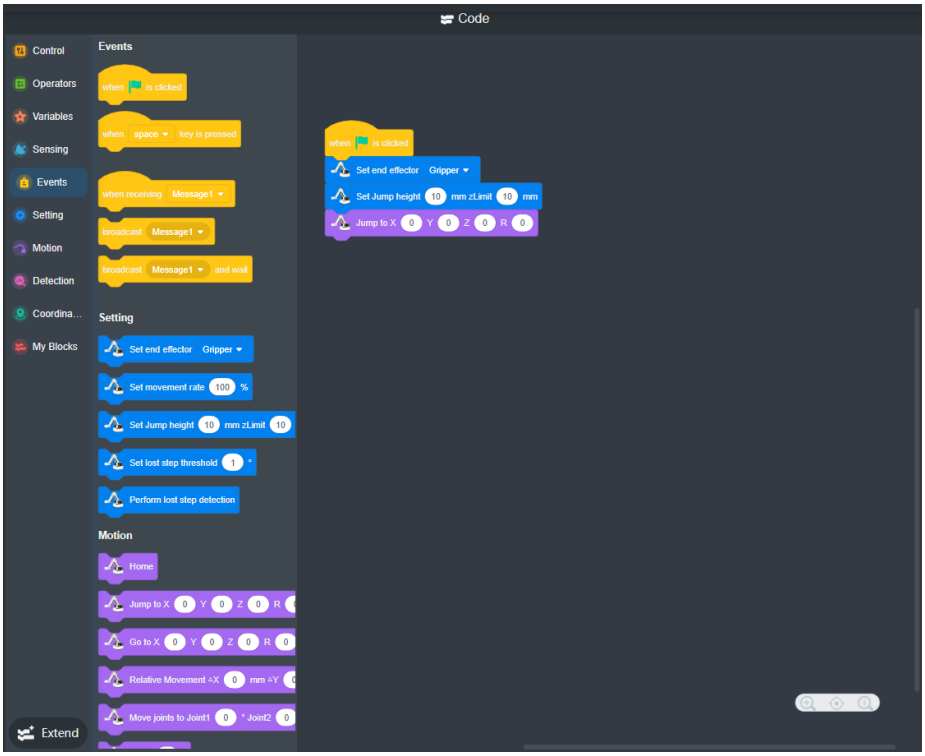



Figure 5.12 Blockly programming

If you need to set sprites and stages in the program, follow Step 7~ Step 10.

**Step 7** Click  under **Sprite** tab. The sprites that DobotBlock Lab supports are shown as follows.

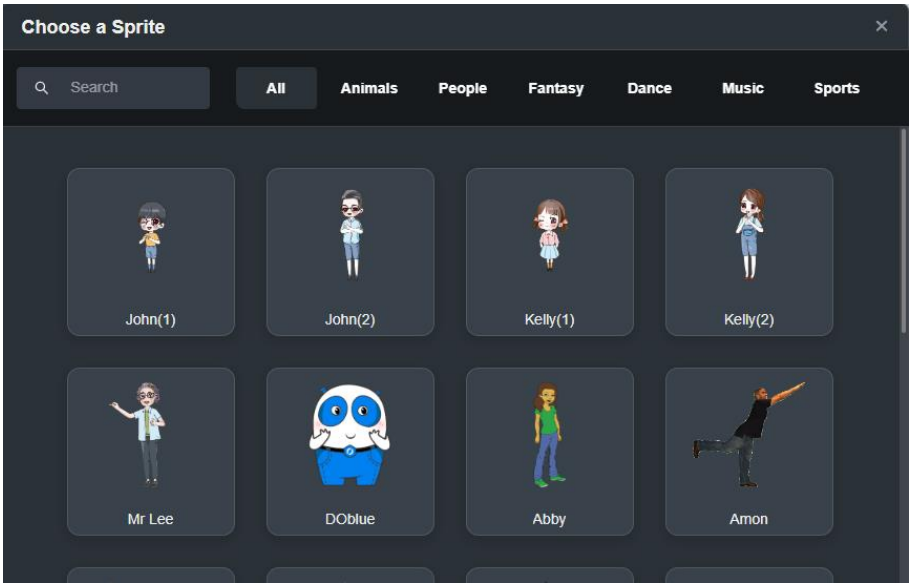
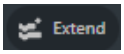



Figure 5.13 Sprite list

**Step 8** After selecting a sprite, click  if you need to add extension blocks. Then click an extension kit to add its corresponding blocks into the block area.

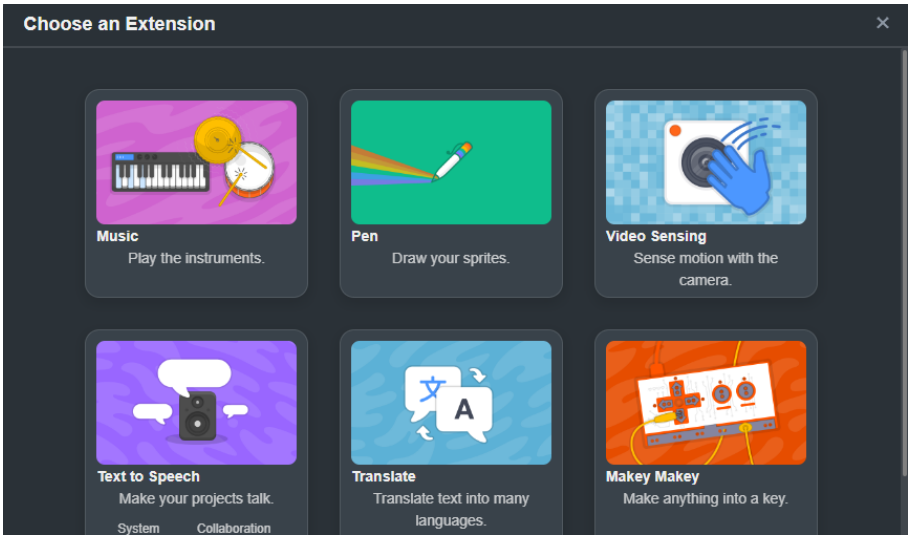



Figure 5.14 Sprite extension kit

**Step 9** Click  . Choose a backdrop, as shown below. You can also upload or draw a backdrop.

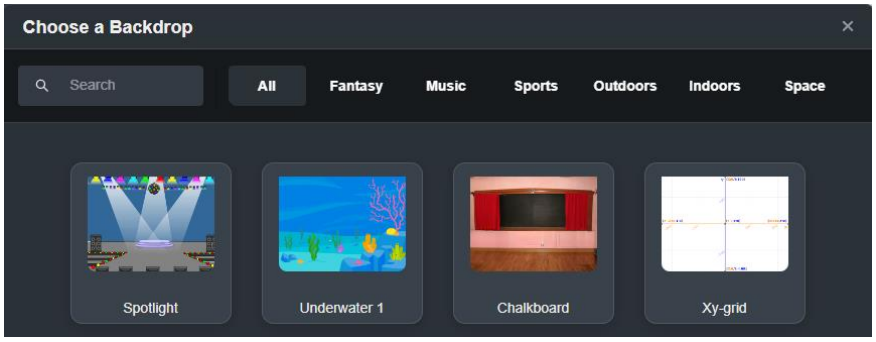



Figure 5.15 Choose stage

**Step 10** Drag the blocks to code area to control the sprite and stage.

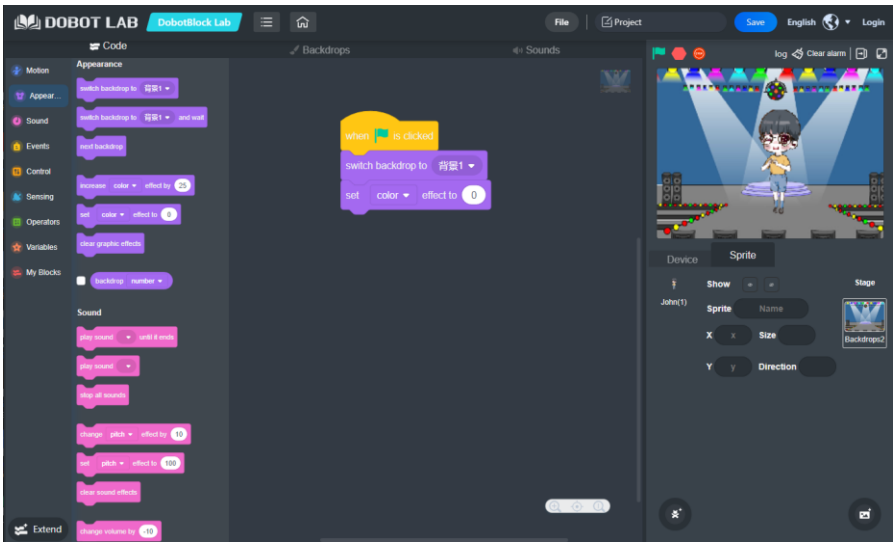
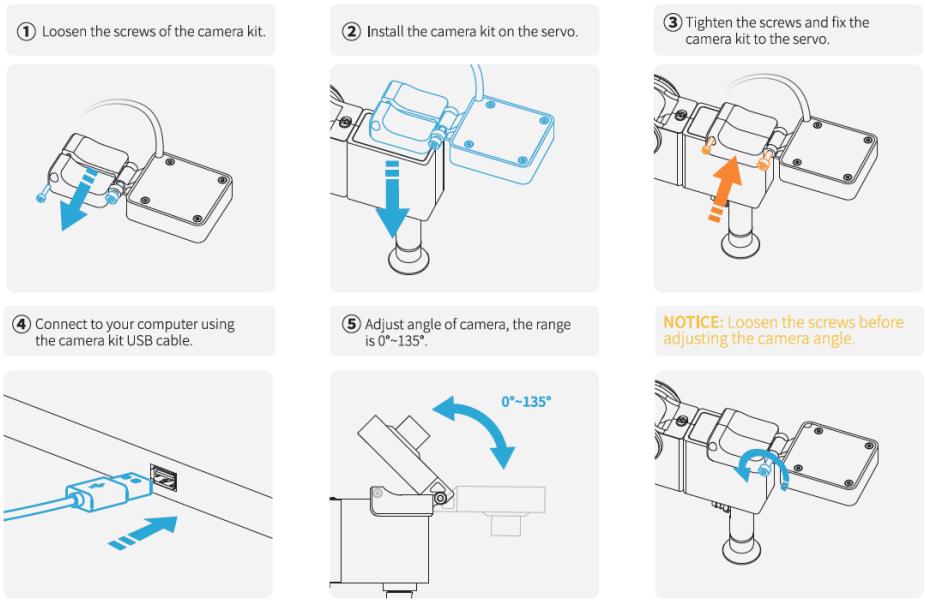



Figure 5.16 Sprite programming

## 5.4 AI Camera Tutorial

### 5.4.1 Installing the camera




### 5.4.2 Image recognition

**Step 1** After adding AI expansion, find the **Image recognition** classification in the **AI** block group, and click **New classification data** to create image data.

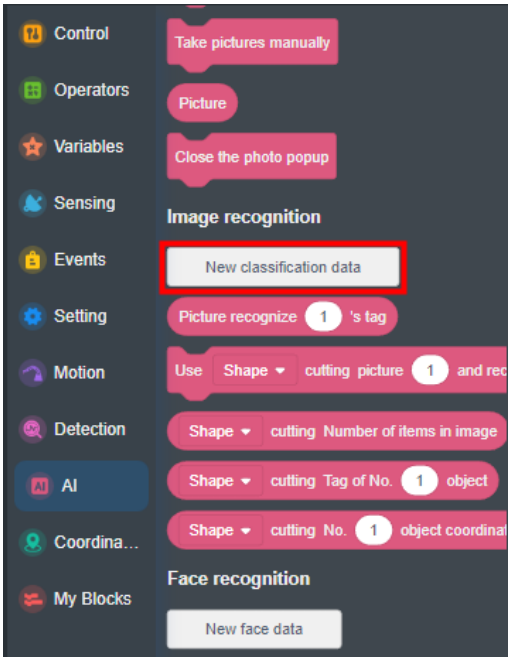



Figure 5.17 New classification data

**Step 2** Click  to get the picture and name the picture label.

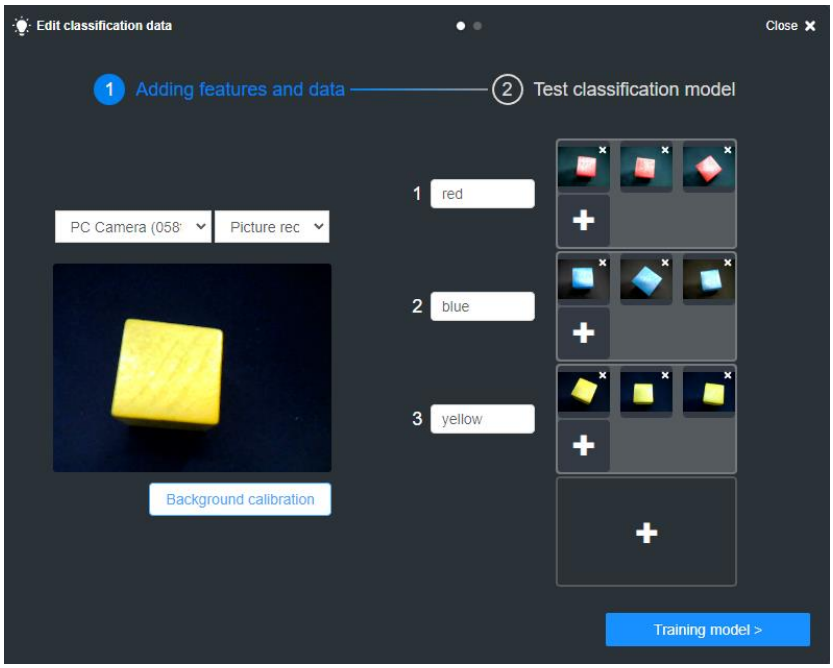



Figure 5.18 Get pictures and name them

**Step 3** Click the **Training model** to test image, and place each color under the camera for feature matching (If the camera background is not pure white, you need to click **Background calibration** first).

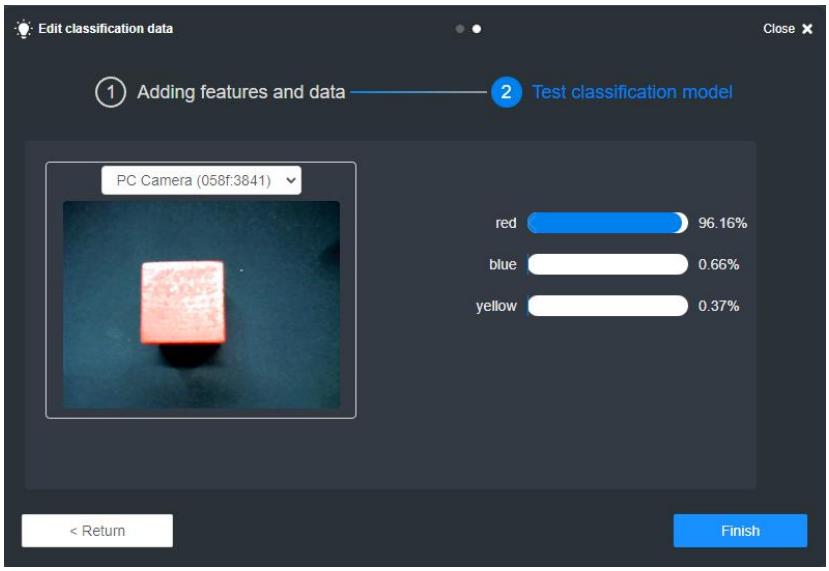



Figure 5.19 Matching red

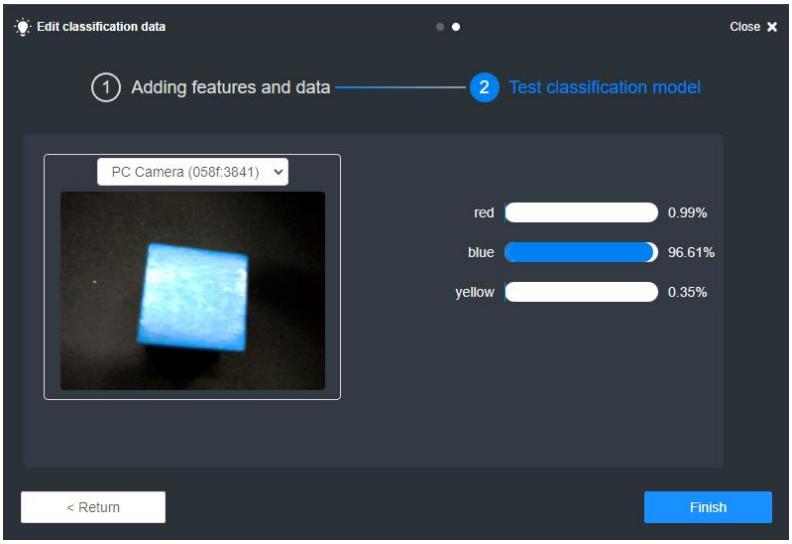



Figure 5.20 Matching blue

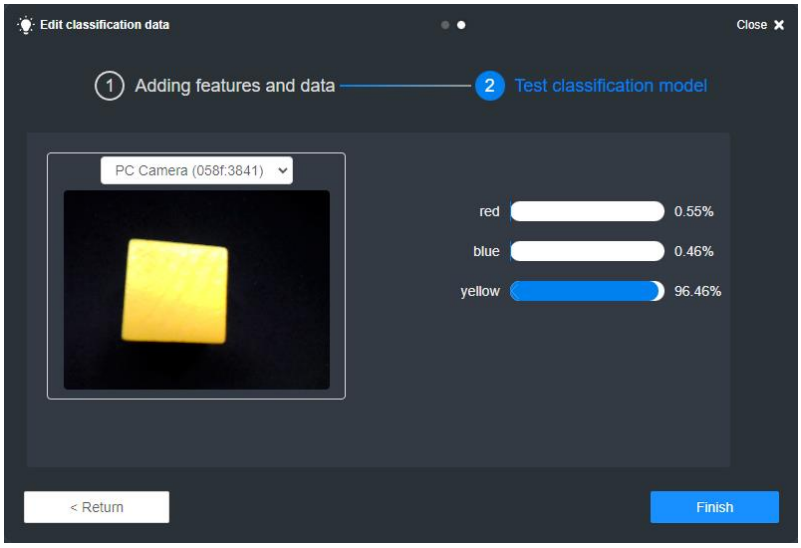



Figure 5.21 Matching yellow

**Step 4** When the model matching is close to 100%, click **Finish** to complete the model training (if the model matching fails, you need to recollect pictures to re train).

**Step 5** Classify wood cubes of different colors according to model matching. The sample program is as follows.

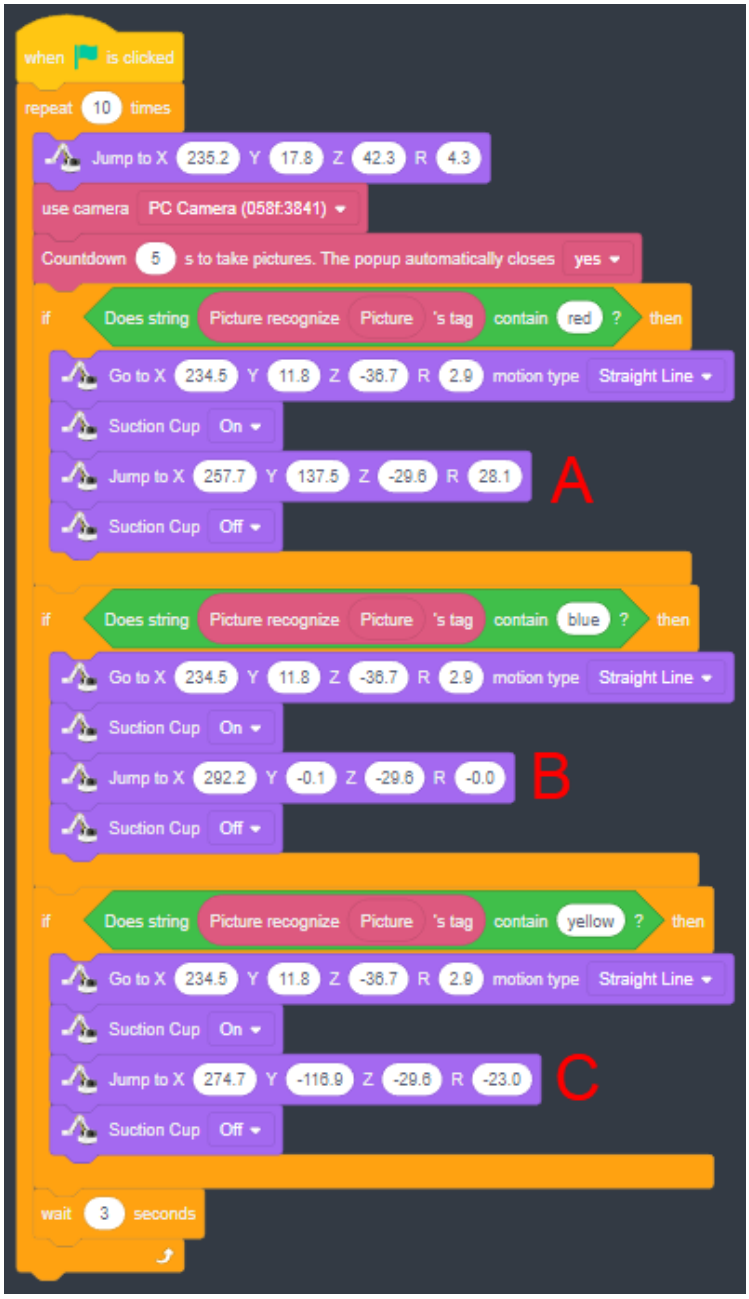



Figure 5.22 Image recognition program

NOTICE

- Classification points A, B, C can be set by the user according to the actual situation.
- To ensure that the suction cup holds the object accurately, please press and hold the unlock button on the forearm and drag the end until the suction cup is lightly pressed on the object, then fill the coordinates of the target point into the commands.

Click  to run the program, put wooden cubes of different colors under the camera, and observe the operation of the robotic arm.

### 5.4.3 Face recognition

**Step 1** Click **New face data** to pop up the new face data interface.

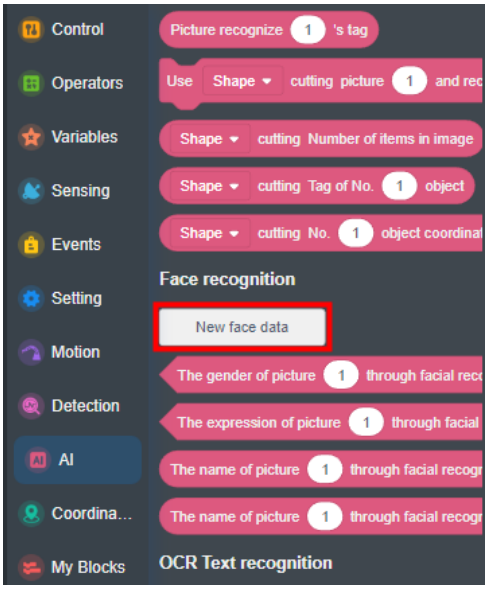



Figure 5.23 New face data

**Step 2** Click  to get the face picture and name the picture label.

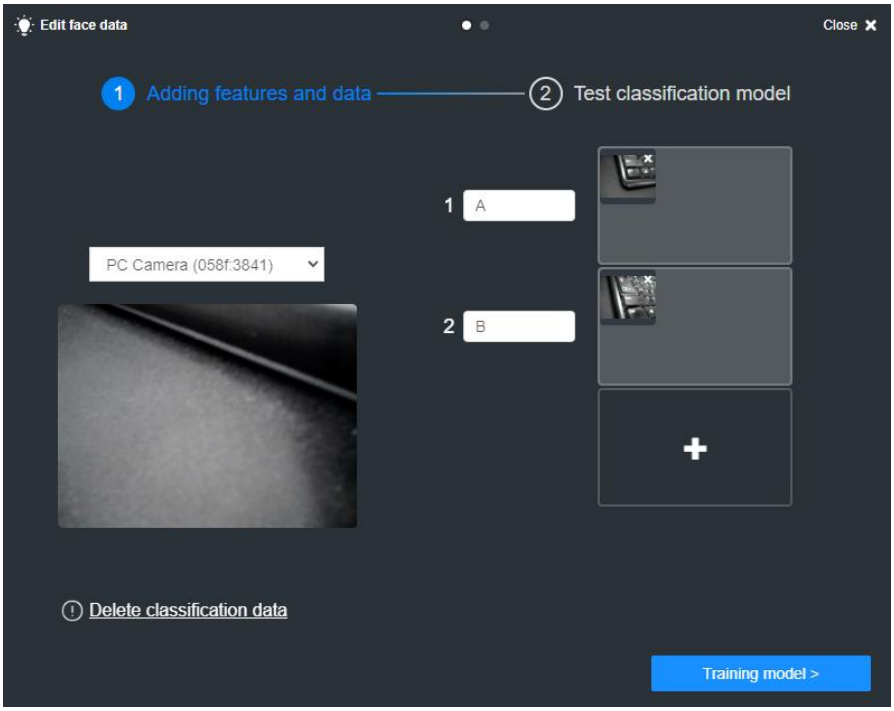



Figure 5.24 Get face pictures and name them

**Step 3** Click the **Training model** to test image.

**Step 4** Align the face with the camera, click **Test** to start feature matching. If the matching degree is close to 100%, click **Finish** to complete the matching. If the matching degree is low, you can return to re-acquire face pictures for secondary matching.

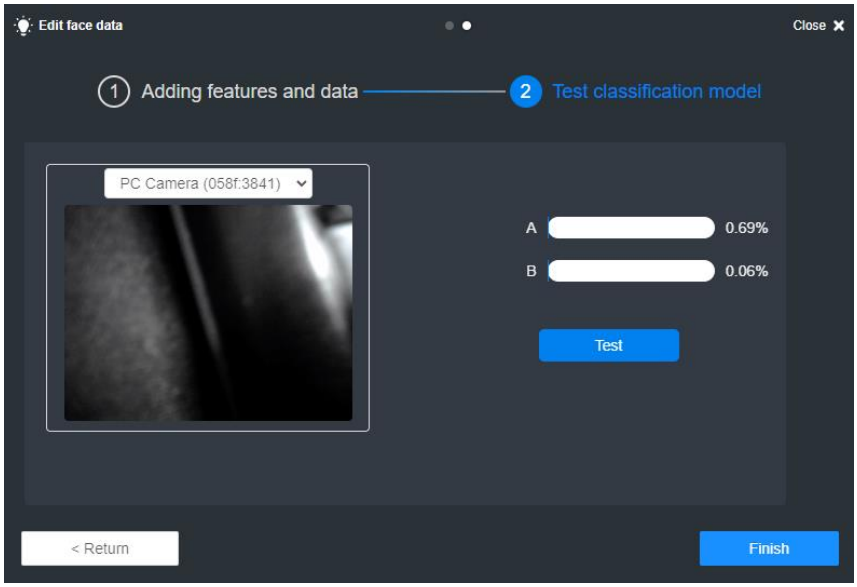



Figure 5.25 Finish training

**Step 5** Move the robotic arm to different positions according to different face recognition results. The sample program is as follows.

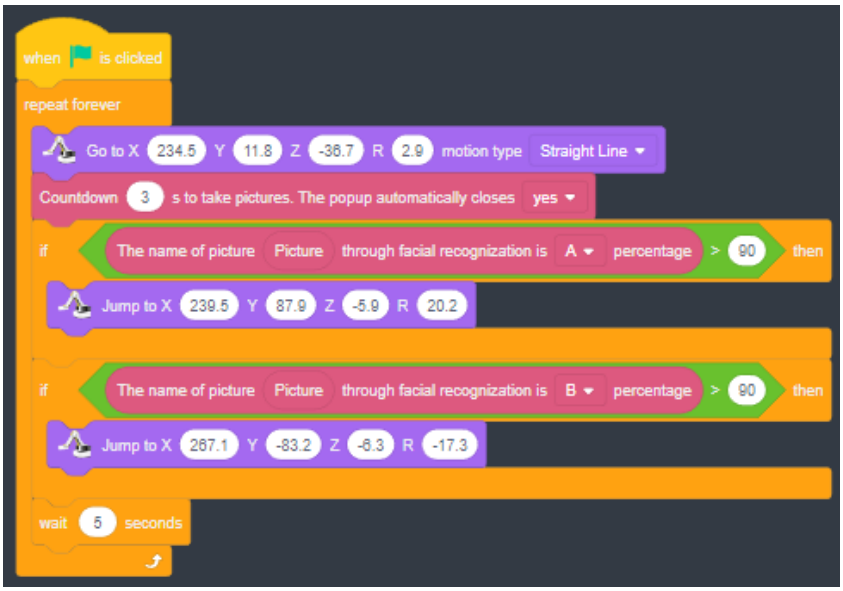



Figure 5.26 Face recognition program

### 5.4.4 OCR text/ID card recognition

OCR text recognition does not require model training, just put the text under the camera for recognition.

According to the identification result of the ID card, if the name is "Sam", then recognize the text and move to a different position according to the text. The sample program is as follows.

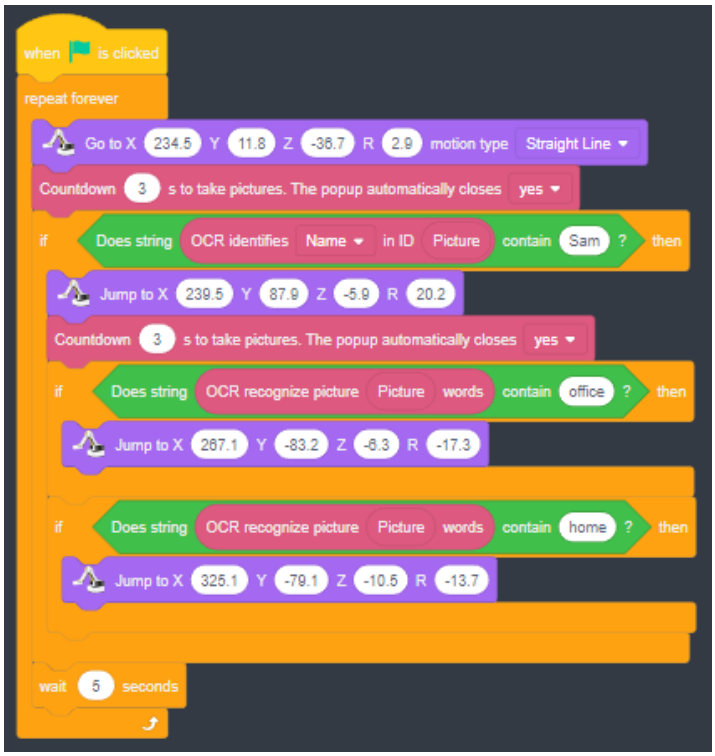



Figure 5.27 OCR recognition program

## 5.5 Python Programming

You can control Dobot Magician Lite through script. Magic Box provides various APIs, such as velocity/acceleration setting, motion mode setting, and I/O configuration, which uses Python language for secondary development.

The main interface of Python Lab is shown in Figure 5.28, and the specific description is listed in Table 5.2.

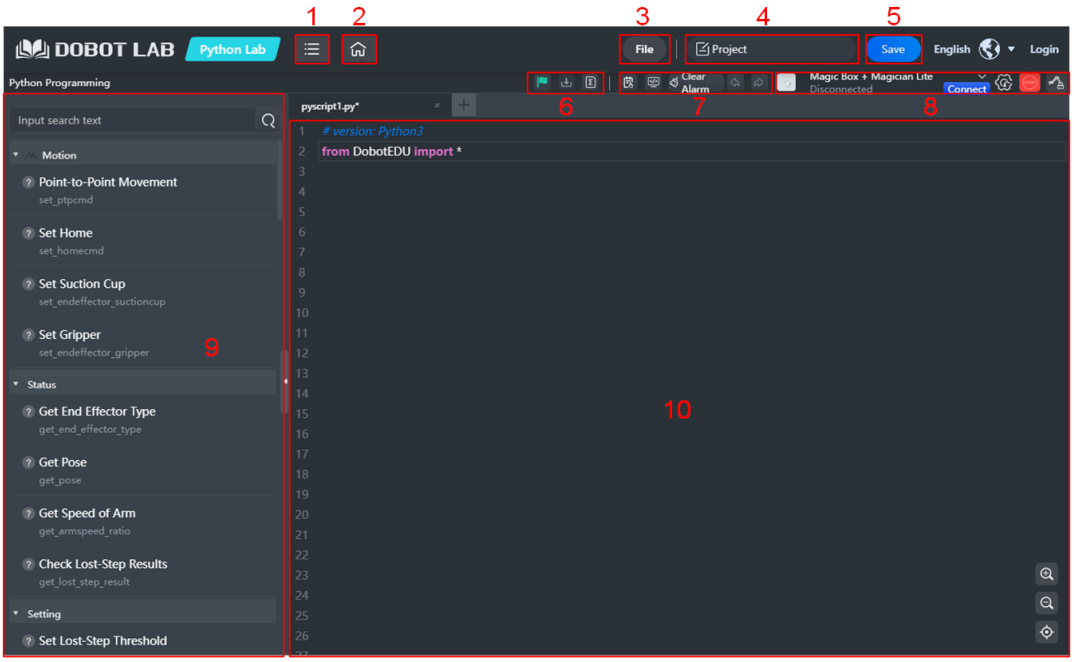
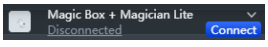



Figure 5.28 Python main page

Table 5.2 Python Lab main interface

| No. | Function | Description |
|---|---|---|
| 1 | Menu | Currency: View the guidance for Python Lab<br>Help: View the documents related to DobotLab and devices<br>Feedback: Enter your feedback about DobotLab experience<br>About: View the basic information on DobotLab |
| 2 | Home | Back to DobotLab main page |
| 3 | File | It includes functions such as new, open, save as, upload from local, etc.<br>**Import** and **Upload from Local** can be used to open script files in Python Lab, but for **Import**, the file should be in .py format, and for **Upload from Local**, the file should be in .json format. The format requirements for **Export** and **Save to Local** are the same as **Import** and **Upload from Local** respectively. |
| 4 | Project name | Display the name of the current project |
| 5 | Save | Save the current project to **My Works** |
| 6 | Program control |  : Start to run the program in the code area<br>  : Download the current program in the code area to Magic Box (there is no such button when MagicianLite is connected separately)<br>  : Install the Python extension library, after which you can call the functions in the extension library |
| 7 | Running information |  : Display alarm information and logs.<br>  : Display running process.<br>  : Clear all alarms. It has the same function as the "Clear Alarm" button in the alarm pop-up window.<br>  : Undo or redo an operation. |
| 8 | Device control |  : Select a target device and establish a communication connection with the device<br>  : Set common device types (only checked devices will be displayed in the drop-down box on the left when they are searched)<br>  : Emergency stop button, press it to stop the robot in an emergency.<br>  : Click to open the control panel of the robotic arm, which can be used to control the movement of the robotic arm. |
| 9 | Command list | Provide programming commands. You can double click the commands to display their corresponding codes in code area. Click  to view the help documentation for the command. |
| 10 | Code area | Edit programs using Python |

**Prerequisites**

Dobot Magician Lite has been powered on and connected to DobotLab.

**Procedure**

**Step 1** Click  on DobotLab main page to enter Python Lab.

**Step 2** Click the drop-down list of device connection panel, as shown below. Choose **Magician Lite** (or **Magic Box + Magician Lite**) and click **Connect**.

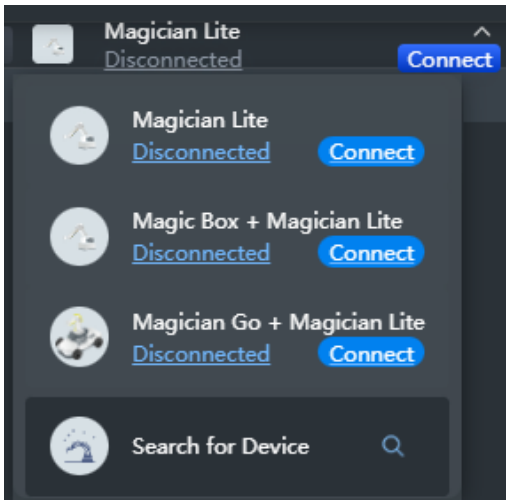



Figure 5.29 Connect device

Now the Magician is connected to DobotLab successfully.

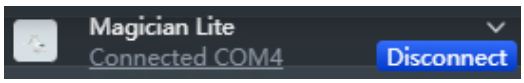



Figure 5.30 Device connected

**Step 3** After connecting Magician Lite to DobotLab, you can start to write programs. Enter the script in the code area, or double-click commands in the command list and modify the parameters according to your actual use.

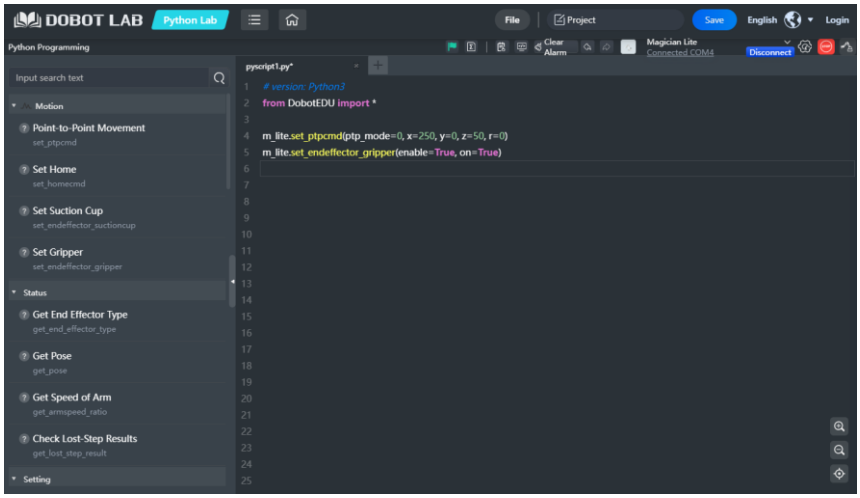



Figure 5.31 Write Python programs

**Step 4** Click  to run the current program.

**Step 5** Click **File** > **Save**. Enter the project name and save the project to My Works.

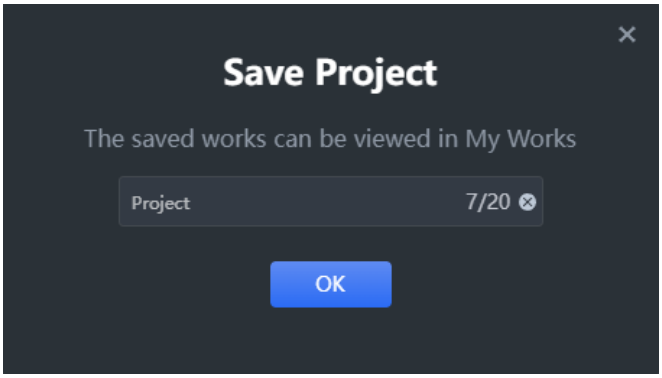



Figure 5.32 Save the project

**Step 6** (optional) Click  to download the script to Magic Box.

NOTE

The script can be downloaded from DobotLab to Magic Box only in wired control mode.

## 5.6 Writing and Drawing

Figure 5.33 shows the process of writing and drawing.

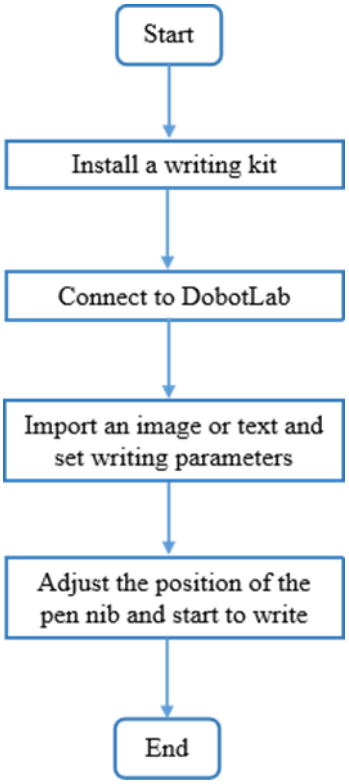



Figure 5.33 The process of writing and draw

### 5.6.1 Installing a Writing and Drawing Kit

A writing and drawing kit consists of a pen and a pen holder. The specific installation steps are shown below.

**Step 1** Place a pen in the pen holder.

**Step 2** Insert the writing and drawing kit to the end of Magician Lite. If you hear a sound, the writing and drawing kit is fixed, as shown in Figure 5.34.


Figure 5.34 Install a writing and drawing kit

NOTE

- If you need to change the ink tube, unscrew the suction tube inside the pen, and then replace it with the ink tube that came with the box. After replacement, keep the pen straight down for 2 minutes before using it, as shown in Figure 5.35.


Figure 5.35 Change ink-straw

- If you want to absorb ink, please remove pen-cap and rotate suction tube to absorb ink as shown in Figure 5.36.

Figure 5.36 Absorb ink

**Step 3** Place a sheet of paper on the work surface within the workspace of Magician Lite.

### 5.6.2 Drawing Operations (Without Sliding Rail)

#### 5.6.2.1 Connecting DobotLab

**Step 1** Click  on DobotLab main page to enter Writing and Drawing Lab.

**Step 2** Click the drop-down list of device connection panel, as shown below. Choose **Magic Box + Magician Lite** and click **Connect.**

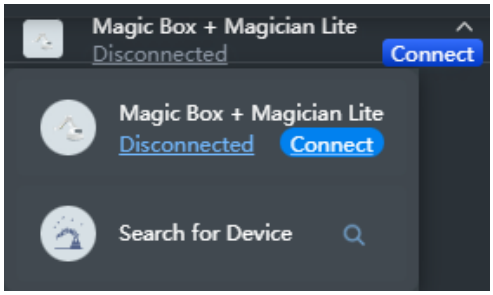



Figure 5.37 Connect device

Now Magician Lite is connected to DobotLab successfully.

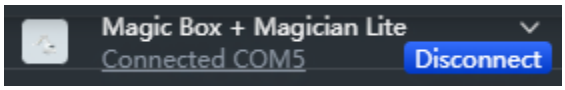



Figure 5.38 Device connected

#### 5.6.2.2 Importing Image Files and Setting Writing Parameters

Before the Magician Lite starts to write and draw, you need to import an image or enter characters as the target model.

**Step 1** Enter the text in the rectangle box (take 10 as an example), and click  . Now the graphic appears in the drawing area.

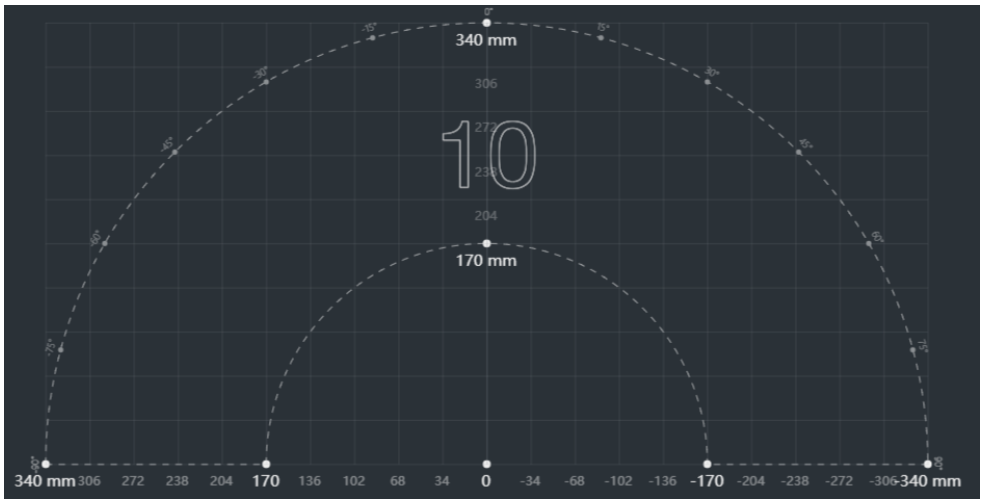



Figure 5.39 Add text

If you need to insert an image, click Open to select an image from local. If the image format is not SVG, the SVG Format Conversion prompt box will pop up. In this case, select the conversion scale and click **OK**.

**Step 2** Drag the graphic to an appropriate area. You can set the position, size, rotation angle or flip mode of the graphic through the image settings in the upper left corner.

NOTE

The image in the drawing area should be placed within the annular area. If not, the robot arm reaches its limited position and cannot draw or write. In this case, the image is highlighted with a red border, as shown below.

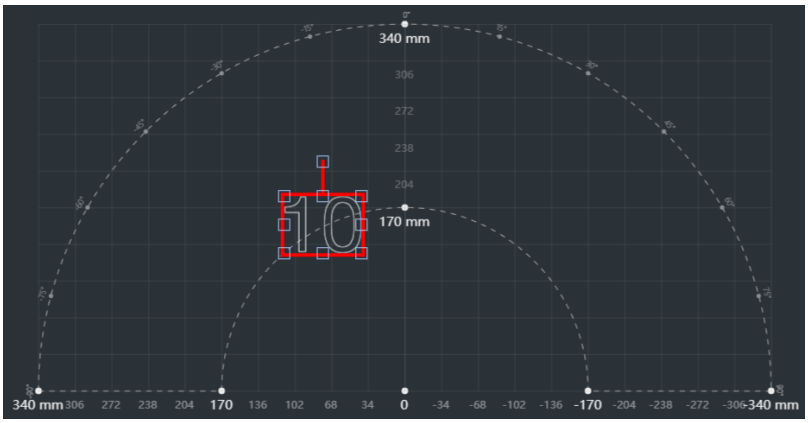



Figure 5.40 Image beyond bound

**Step 3** Click Settings to set the pen lifting height, descent height and speed.

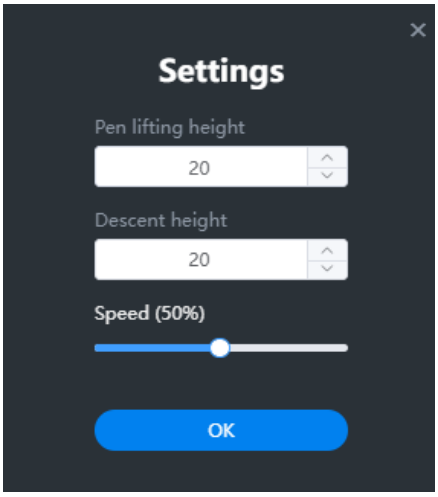



Figure 5.41 Set pen lifting height, descent height and speed

NOTE

Generally, you can set the pen lifting height and descent height to 20 by default.

**Step 4** Press and hold the **Unlock** button on the forearm to move Magician to lower the pen nib until it slightly squeezes the paper. You can also jog Magician in Arm Control Panel to slowly pull the Z coordinates down to a suitable position for writing, as shown in Figure 5.42. Click Auto Z to obtain and save the current value of Z axis.

Figure 5.42 Adjust the pen nib

**Step 5** Click Synchronize to move the nib over the starting point of drawing.

NOTE

If you do not click **Synchronize** before running, the image can also be drawn normally. After you click **Run**, the robot arm moves directly over the starting point to draw.

#### 5.6.2.3 Drawing

**Step 1** Click , and Magician Lite starts to draw the image. Now the cursor shows the position of the nib in real time. The running progress is displayed below the drawing area. During the drawing process, you can pause or stop drawing at any time.

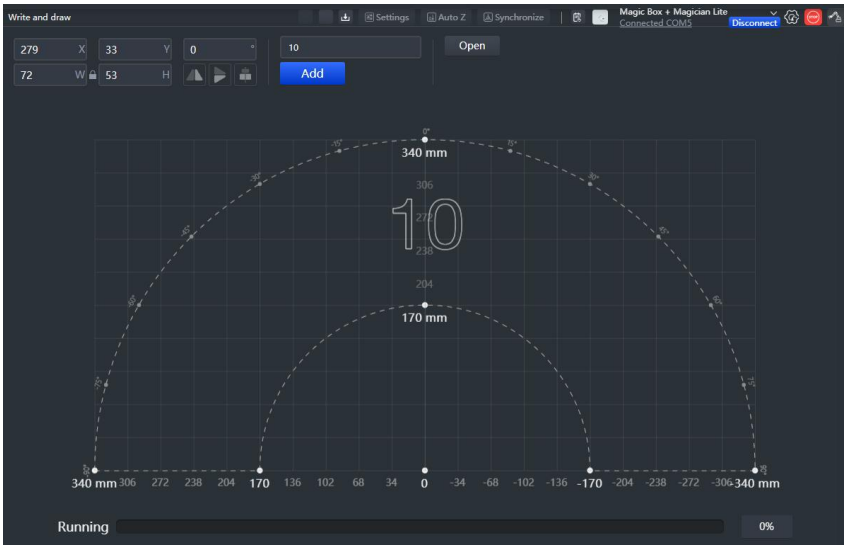



Figure 5.43 Drawing progress

**Step 2** (optional) Click **File** > **Save**. Enter the project name and save the project to My Works.

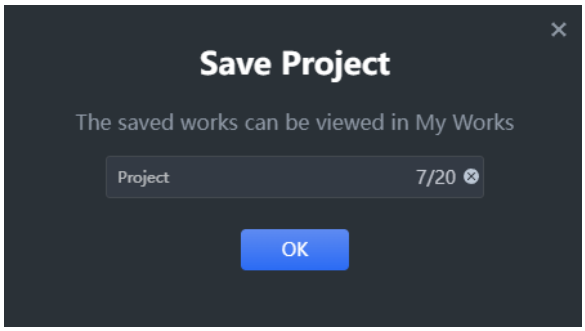



Figure 5.44 Save the project

**Step 3** (optional): Click to download the file to Magic Box.

NOTE

You can click **Download** to download the file to Magic Box to perform in offline mode. For details, refer to 5.9Working in Offline Mode.

### 5.6.3 Installing a Sliding Rail Kit

When the workspace of Dobot Magician Lite is not enough, you can extend the space with a sliding kit, so as to realize such tasks as long-distance picking, writing couplets and so on.

**Procedure**

**Step 1** Mount Dobot Magician Lite on the plate a with four M3*10 countersunk head cap screws Make The counter bore of plate an outward), as shown in Figure 5.45.


Figure 5.45 Fix plate a

**Step 2** Fix the plate a (with Dobot Magician Lite) on the plate b with three M3*8 hexagon socket head cap screws. Please make the back of the base of Dobot Magician Lite towards the rabbet on the plate b, as shown in Figure 5.46.

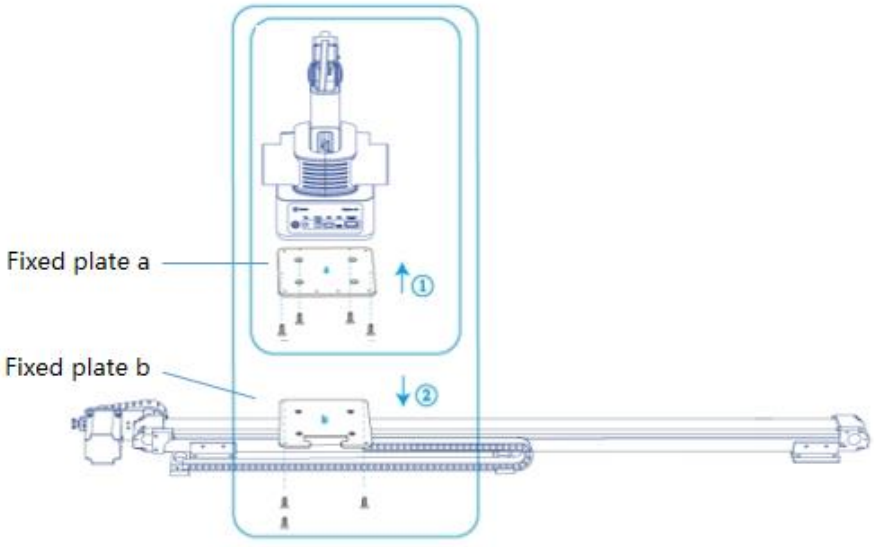



Figure 5.46 Fix Magician Lite

**Step 3** Connect the end of the wire set to the plate b with a M3*6 countersunk head hexagon screw, as shown in Figure 5.47.

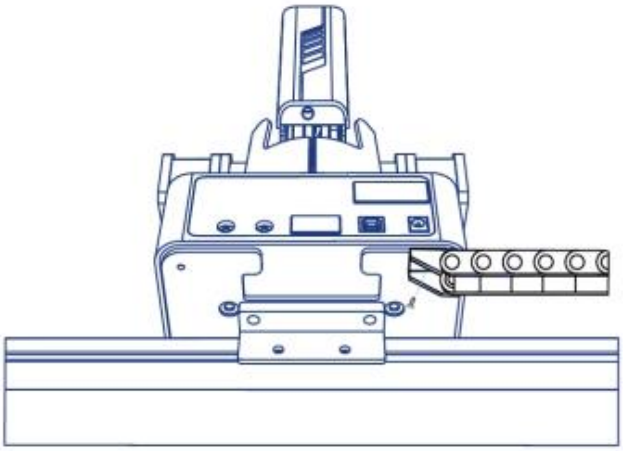


Figure 5.47 Connect to wire set

**Step 4** Connect the green interface and yellow interface of the wire set to Port4 and STP2 of Magic Box respectively, as shown below.

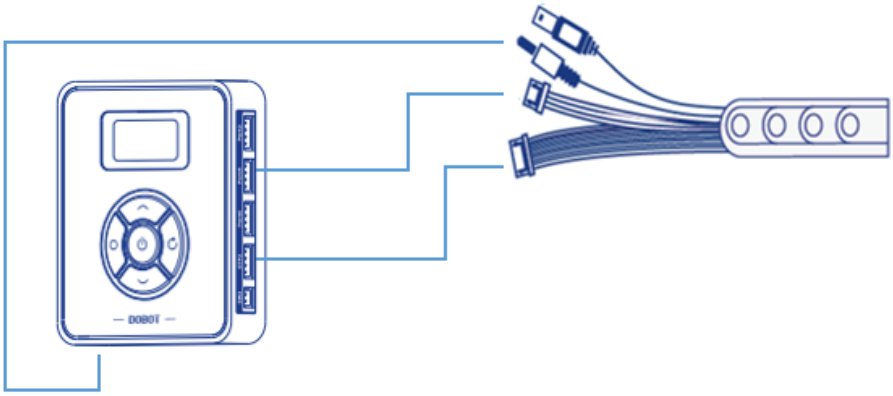


Figure 5.48 Connect to Magic Box

**Step 5** Connect the interfaces on the other end of the wire set to the USB interface of Magic Box, motor interface and homing interface of the sliding rail respectively. Figure 5.50 shows the interfaces on the other end of the wire set.

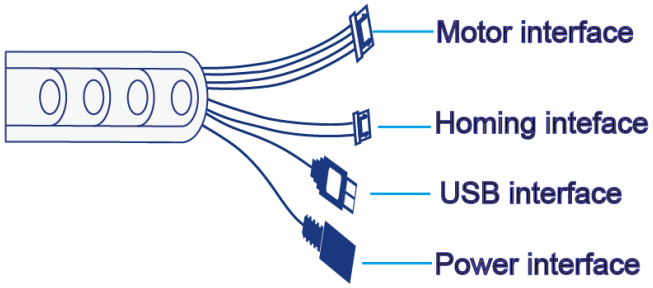



Figure 5.49 Interfaces on the other end of the wire set

Figure 5.50 shows the connection between the sliding rail and the wire set.

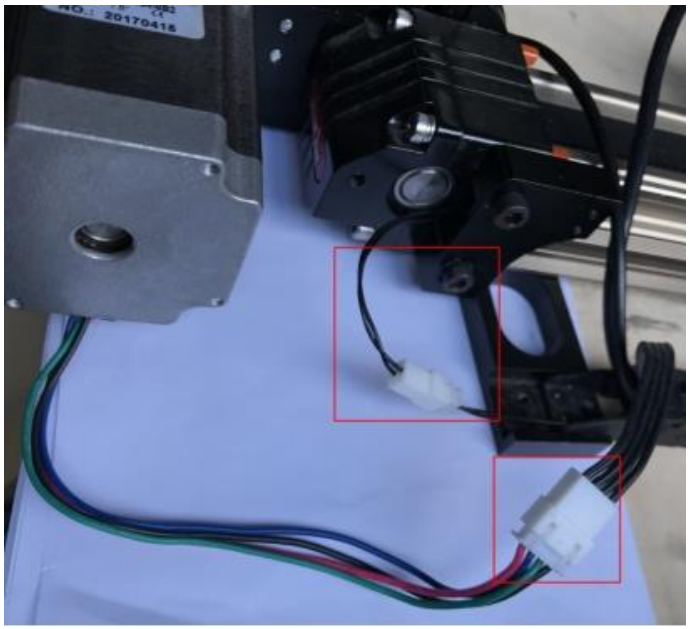


Figure 5.50 Connect sliding rail and wire set

### 5.6.4 Drawing Operations (with a Sliding Rail)

This section describes how to use a sliding rail for writing.

**Prerequisites**

- The sliding rail kit has been installed and connected to the Dobot Magician Lite through Magic Box.
- Dobot Magician Lite has been powered on and connected to DobotLab successfully.
- The writing kit has been installed.

#### 5.6.4.1 Connecting DobotLab

**Step 1** Click  on DobotLab main page to enter Writing and Drawing Lab.

**Step 2** Click the drop-down list of device connection panel, as shown below. Choose corresponding device and click **Connect.**

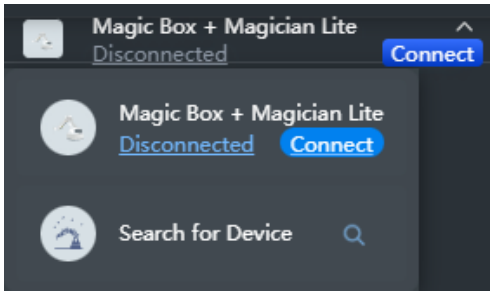



Figure 5.51 Connect device

Now Magician Lite is connected to DobotLab successfully.

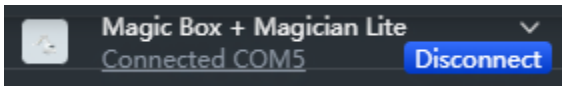



Figure 5.52 Device connected

### 5.6.4.2 Connecting Sliding Rail

**Step 1** Enable **Rail** on the arm control panel, as shown in Figure 5.53.

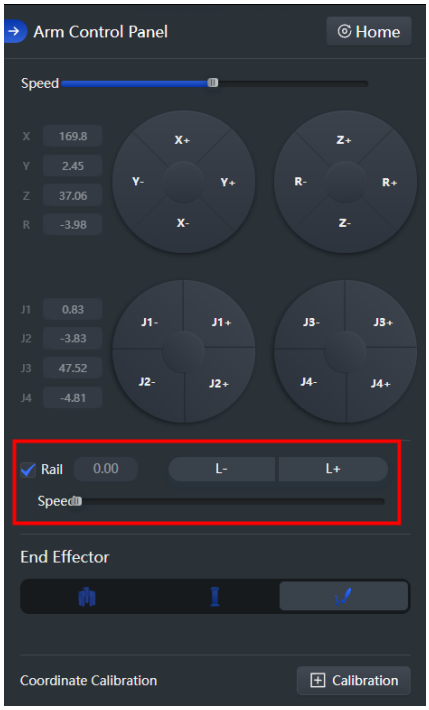



Figure 5.53 Enable sliding rail

The drawing area is shown in Figure 5.54.

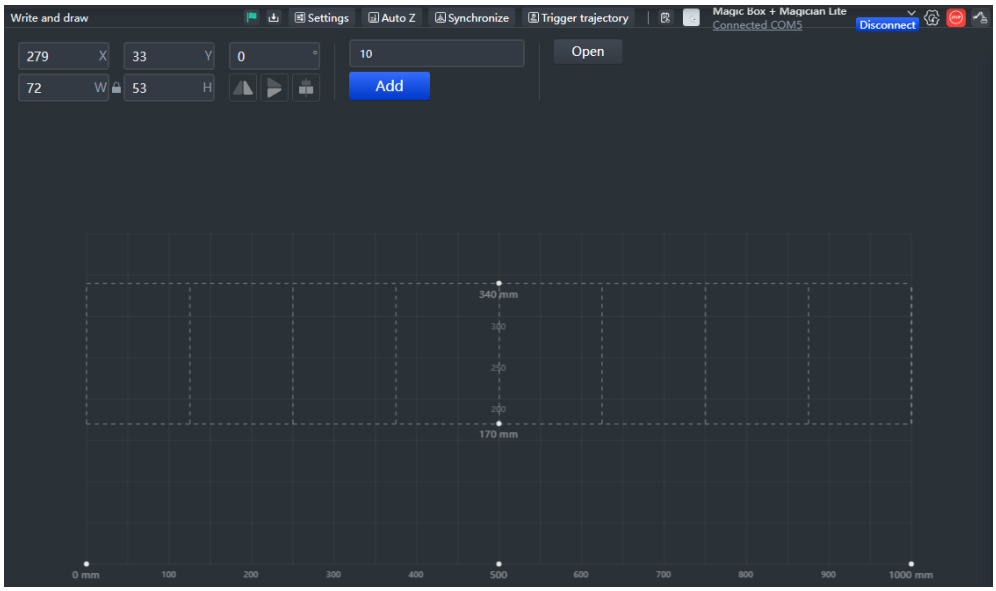



Figure 5.54 Drawing area (sliding rail connected)

**Step 2** Click **L+** or **L-** to test whether the sliding rail can move properly.

**Step 3** Click **Home** on the arm control panel.

The sliding rail starts moving to its home point, and at the same time Dobot Magician starts homing.

⚠NOTICE

Before you click **Home**, please take the pen off or raise the Dobot Magician Lite arm up.

### 5.6.4.3 Importing Image/Text and Setting Parameters

**Step 1** Enter text verbatim in the text box , and click Add. Now the graphic appears in the drawing area(take “FUTRUE” as an example),.

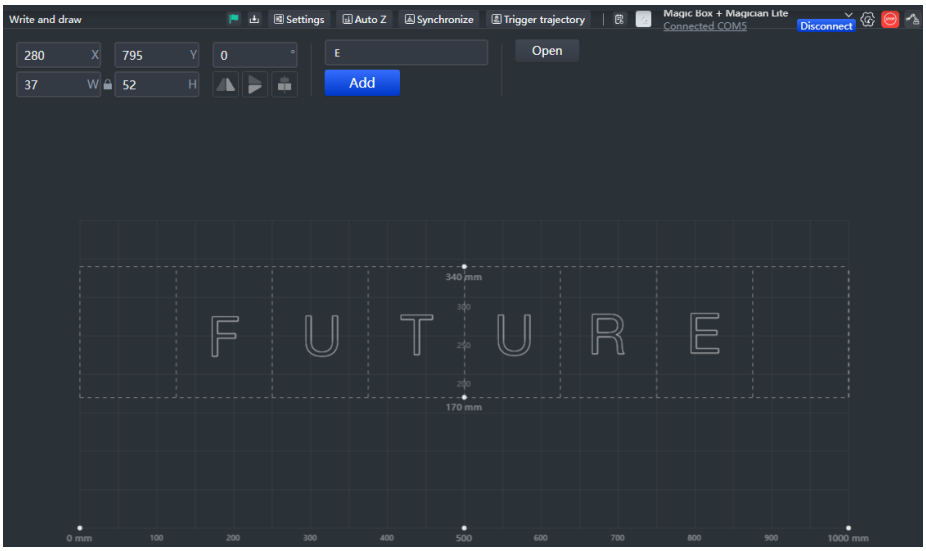



Figure 5.55 Add image

If you need to insert an image, click Open to select an image from local. If the image format is not SVG, the SVG Format Conversion prompt box will pop up. In this case, select the conversion scale and click **OK**.

📖NOTE

- The image in the drawing area should be placed within the rectangular area and should not touch the boundary line or any separator line. Otherwise, the robot arm reaches its limited position and cannot draw or write. In this case, the image is highlighted with a red border.

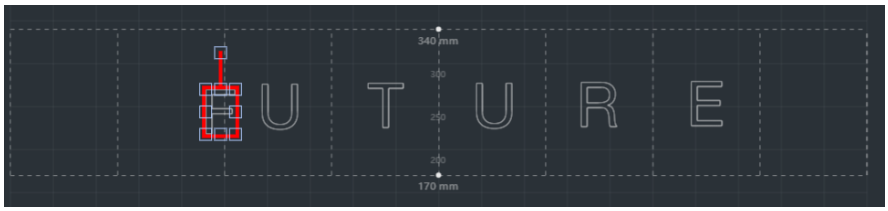



Figure 5.56 Touch separator line

- If the coordinate system of the imported image and the drawing area are set differently, the imported image will be displayed in an inverted direction. In this case, you can flip the image to the correct direction.
- If you want to write the text in a certain order, you need to import an image with a defined point order. If you enter the text through Add Text, the Magician will write the text overall from left to right.

**Step 2** Drag the graphic to an appropriate area. You can set the position, size, rotation angle or flip mode of the graphic through the image settings in the upper left corner.

**Step 3** Click Settings to set the pen lifting height, descent height and speed.

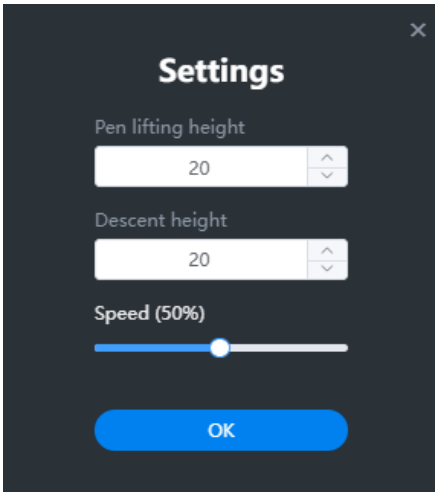



Figure 5.57 Set pen lifting height, descent height and speed

**Step 4** Press and hold the **Unlock** button on the forearm to move Magician Lite to lower the pen nib until it slightly squeezes the paper. You can also jog Magician Lite in Arm Control Panel to slowly pull the Z coordinates down to a suitable position for writing.

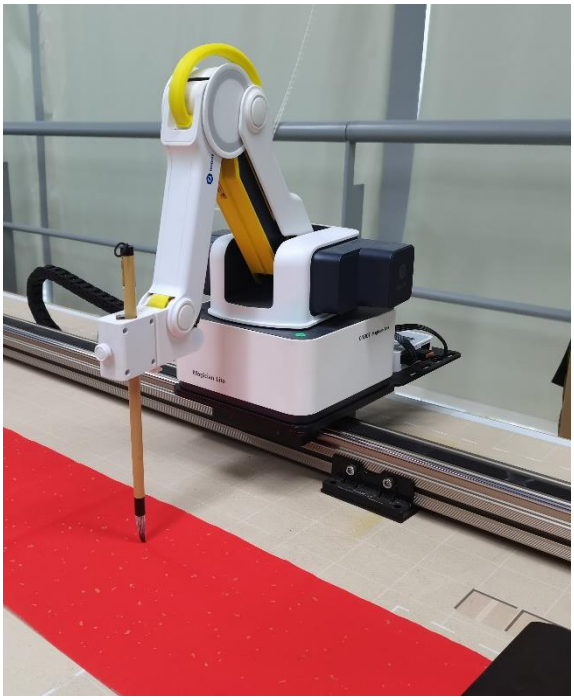


Figure 5.58 Height of brush pen

**Step 5** Click Auto Z to obtain and save the current value of Z axis.

**Step 6** (Optional)Set trigger line and ink dipping position.

NOTICE

If you want to set an action to dip the pen into the ink, you can press **Unlock** key and drag the Magician Lite to a point, and then release the key to get this position.

1. Right-click a position on the drawing area and select **Add Trigger Line**, as shown in Figure 5.59.

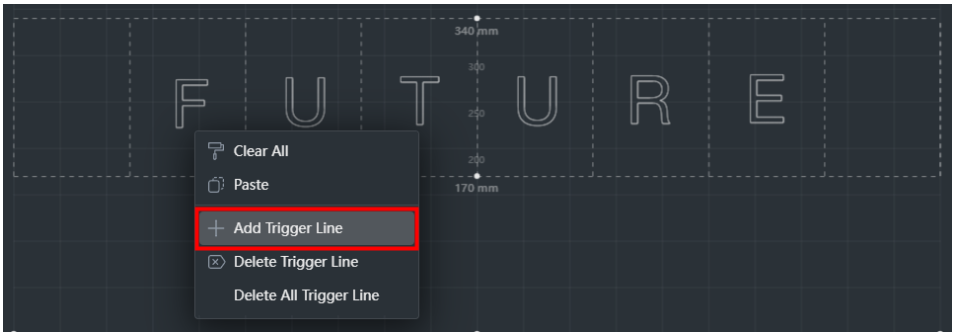



Figure 5.59 Add trigger line

A blue trigger line appears in the drawing area. Move the trigger line to a proper position, as shown in Figure 5.60.

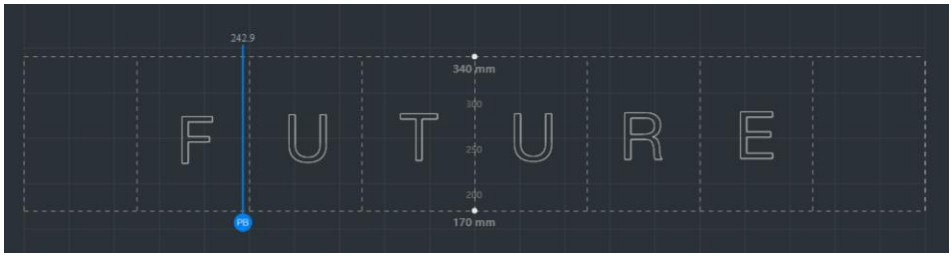



Figure 5.60 Move trigger line

2. Click Trigger trajectory to enter the “Trigger Trajectory” page for setting ink dipping actions, as shown in Figure 5.61.

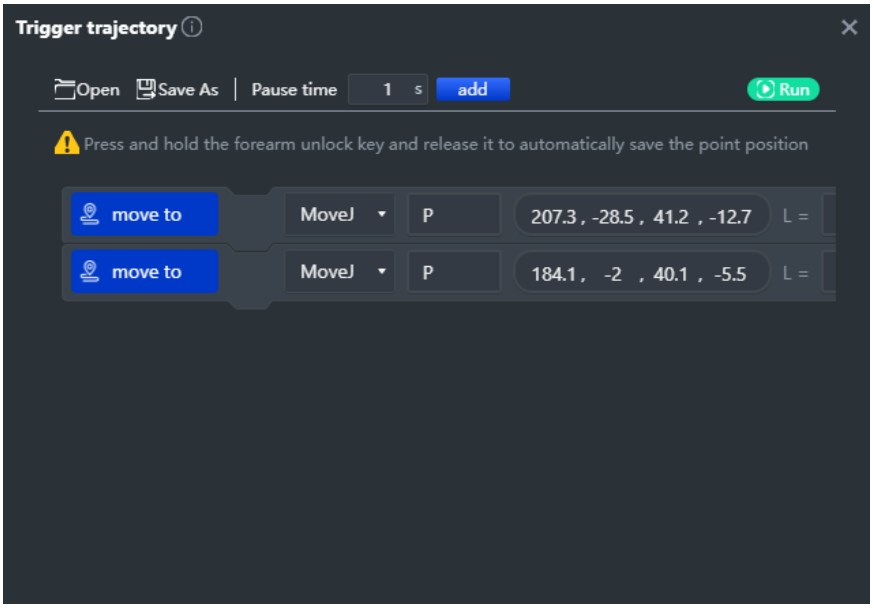



Figure 5.61 Trigger line page

3. Press the **Unlock** key on the forearm, move the forearm over the drawing area, and release the **Unlock** key to record the first point. as shown in Figure 5.62.

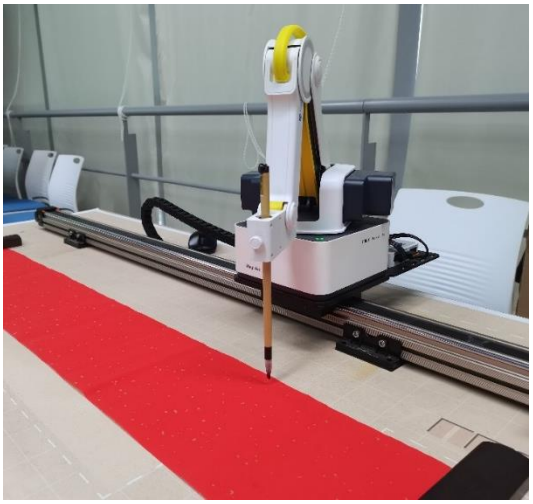


Figure 5.62 Save the first point

⚠NOTICE

Make this point higher within the workplace of Magician Lite to prevent the writing brush from touching the inkstone.

4. Move the forearm to the inkstone positions shown in Figure 5.63, and record these points on the “Trigger Trajectory” page.

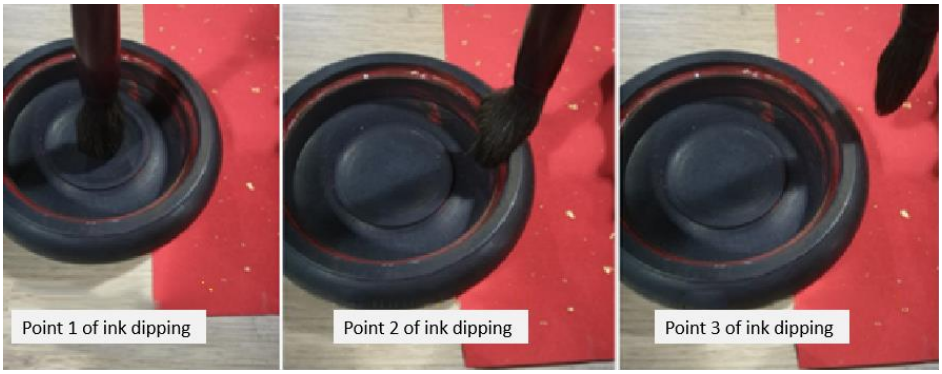



Figure 5.63 Simulate the actions of ink dipping

5. Drag the forearm to raise the writing brush up, for avoiding touching the inkstone.

⚠NOTICE

As the inkstone has its own height, you need to set a suitable rising height to prevent the writing brush from touching the inkstone. Click **Settings** to set the height that is recommended as 50mm to 70mm.

**Step 7** Click Synchronize to move the nib over the starting point of drawing.

📖NOTE

If you do not click **Synchronize** before running, the text can also be written normally. After you click **Run**, the robot arm moves directly over the starting point to draw.

#### 5.6.4.4 Drawing

**Step 1** Click , and Magician starts to write the text. Now the cursor shows the position of the nib in real time. The running progress is displayed below the drawing area. During the drawing process, you can pause or stop drawing at any time.

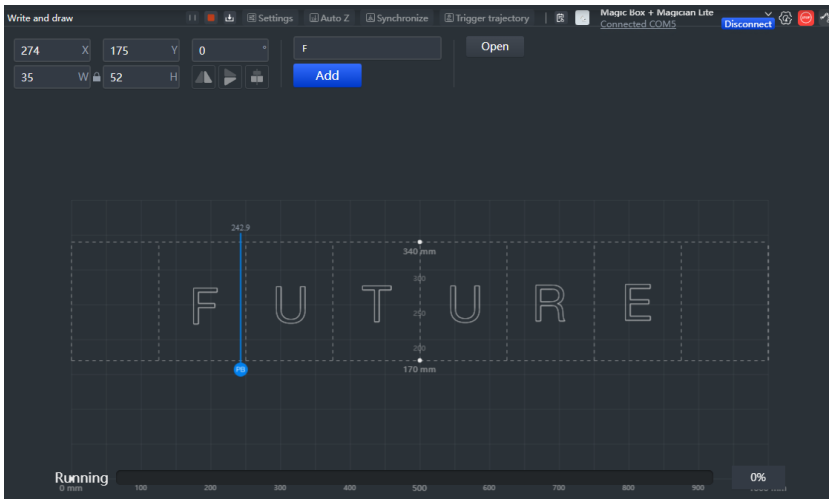



Figure 5.64 Start writing text

**Step 2** (Optional) Click **File** > **Save**. Enter the project name and save the project to My Works.

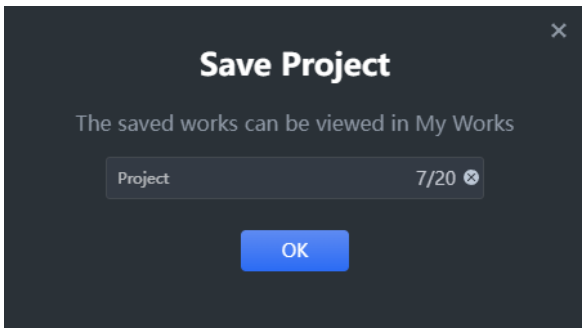



Figure 5.65 Save the file

**Step 3** (Optional): Click  to download the file to Magic Box.

## 5.7 Teaching and Playback

This section introduces how to perform a teaching & playback task to suck or grab an object.

### 5.7.1 Installing a Suction Cup Kit

Magician Lite has a built-in air pump, and its end-effector is suction cup by default, as shown in Figure 5.66.

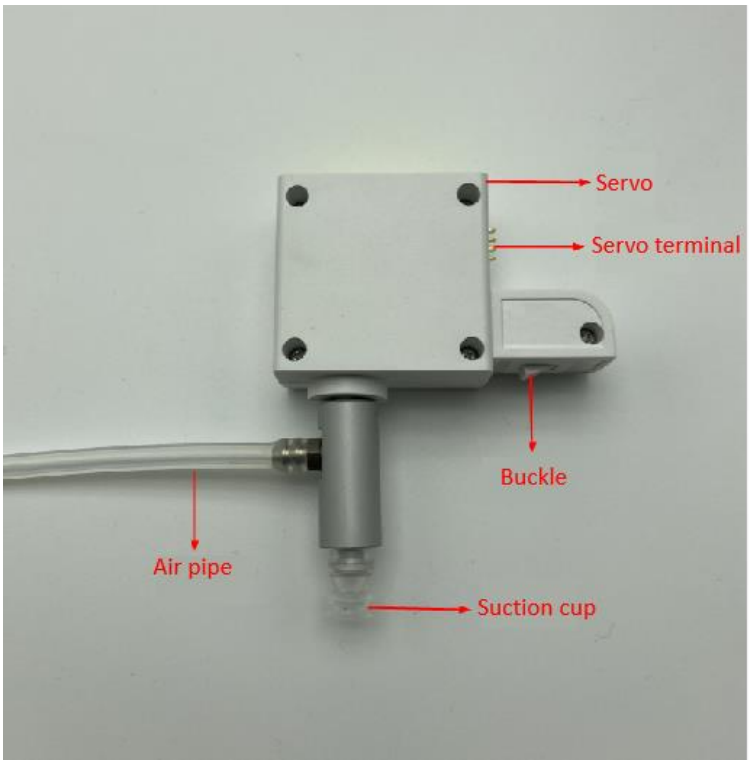



Figure 5.66 Suction cup kit

**Procedure**

**Step 1** Insert a gripper kit into the end of Magician Lite. If you hear a sound, the suction cup is fixed, as shown in Figure 5.67.

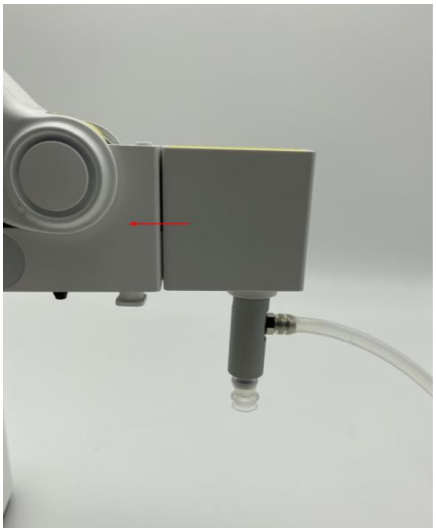


Figure 5.67 Install a suction cup kit

**Step 2** Connect the air tube of air pump to the air tube connector of the suction cup kit, as shown in Figure 5.68.

Figure 5.68 Install an air tube

### 5.7.2 Installing a Gripper Kit

An air pump should be used with the gripper kit, as shown in Figure 5.69, to open or close the gripper.

Figure 5.69 Gripper kit

Install the gripper kit to Magician Lite in the same way as the suction cup kit is installed. For details, refer to *5.7.1 Installing a Suction Cup Kit.* Figure 5.70 shows the effect of the gripper kit installation.

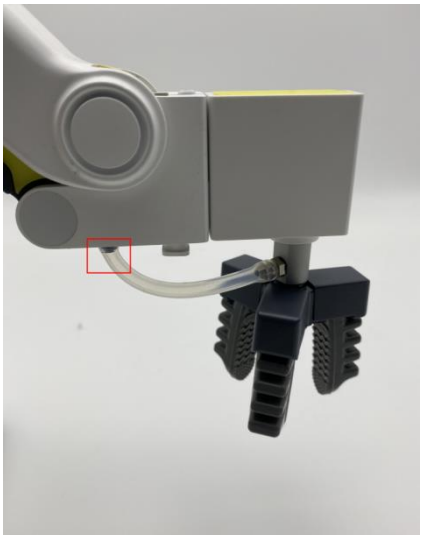


Figure 5.70 Effect of the gripper kit installation

### 5.7.3 Teaching & Playback Operation

The main interface of Teaching and Playback Lab is shown in Figure 5.71, and the specific description is listed in Table 5.3.

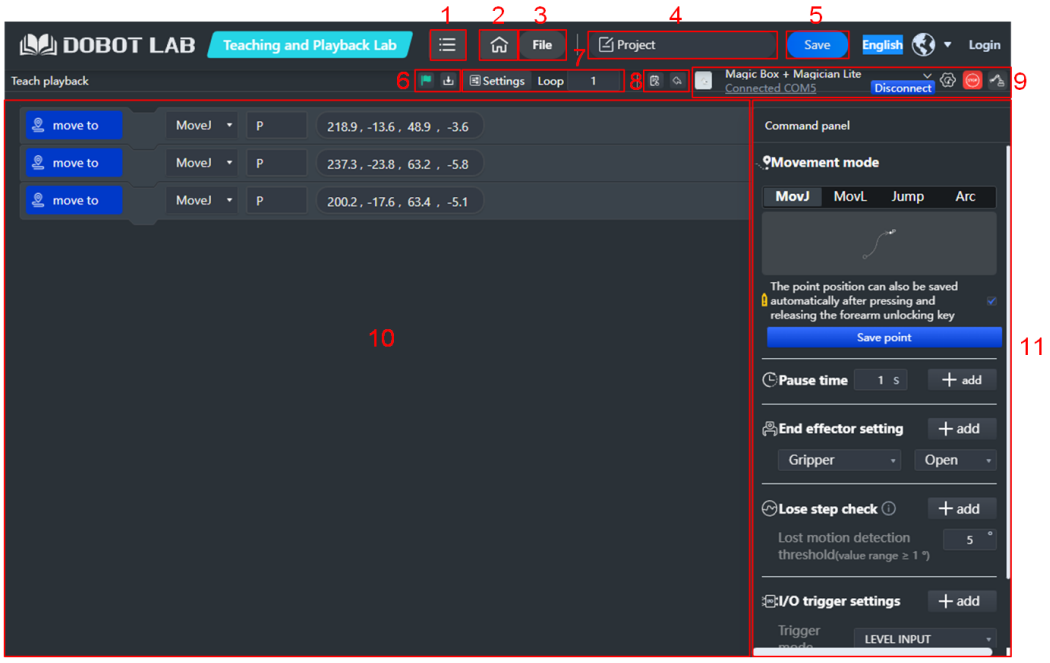
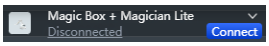



Figure 5.71 Teaching and Playback Lab interface

Table 5.3 Description on Teaching and Playback Lab

| No. | Modules | Description |
|---|---|---|
| 1 | Menu | Currency: View the guidance for Python Lab<br>Help: View the documents related to DobotLab and devices<br>Feedback: Enter your feedback about DobotLab experience |

| No. | Modules | Description |
|---|---|---|
| | | About: View the basic information on DobotLab |
| 2 | Home | Back to DobotLab main page |
| 3 | File | It includes functions such as new, open, save as, upload from local, etc. |
| 4 | Project name | Display the name of the current project |
| 5 | Save | Save the current project to **My Works** |
| 6 | Program control |  : Start to run the program in the code area<br>  : Download the current program in the code area to Magic Box (there is no such button when MagicianLite is connected separately) |
| 7 | Running settings | Settings: Set speed and acceleration<br>Loop: Set the number of times the commands run. Value range: 1~999999 |
| 8 | Log & Undo |  : Display alarm information and logs.<br>  : Undo an operation. |
| 9 | Device control |  : Select a target device and establish a communication connection with the device<br>  : Set common device types (only checked devices will be displayed in the drop-down box on the left when they are searched)<br>  : Emergency stop button, press it to stop the robot in an emergency.<br>  : Click to open the control panel of the robotic arm, which can be used to control the movement of the robotic arm. |
| 10 | Command area | Display added commands. You can right-click a command to copy, paste, or delete it |
| 11 | Command panel | Set motion mode, save points, pause time, end effector, lost-step detection, and I/O trigger |

**Procedure**

**Step 1** Click  on DobotLab main page to enter Teaching and Playback Lab.

**Step 2** Click the drop-down list of device connection panel, as shown below. Choose **Magician Lite** (or **Magic Box + Magician Lite**) and click **Connect**.

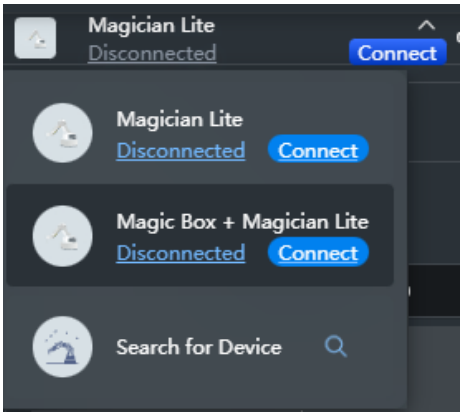



Figure 5.72 Connect device

Now Magician Lite is connected to DobotLab successfully.

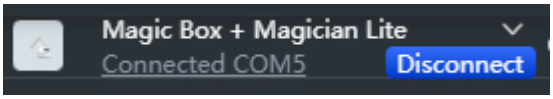



Figure 5.73 Device connected

**Step 3** Set commands in Command panel.

1. **Motion mode**
   - MovJ: Point-to-point movement in the Cartesian coordinate system.
   - MovL: Linear movement in the Cartesian coordinate system.
   - Jump: Move from the current position to a target position in a door-shaped mode
   - Arc: Move from the current position to a target position in an arc interpolated mode.
2. **Save points**
   - Method 1: Press and hold the **Unlock** button on the forearm and then release it to automatically save the point.
   - Method 2: Open the arm control panel, adjust the coordinates by jogging the axis icon, and click Save point in the Command panel.

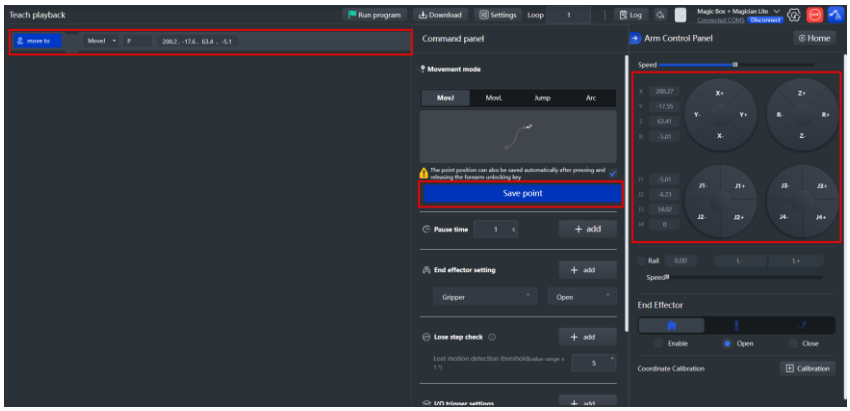



Figure 5.74 Save points

For Jump movement, you need to click “Jump parameter setting” to set the lifting height and maximum lifting height, as shown below.


Figure 5.75 Jump parameter setting

For Arc movement, you need to set the coordinates of the start, intermediate and end points. When setting the start point, you should select the mode of moving to the start point at the same time, and then save the point, as shown in the following figure.

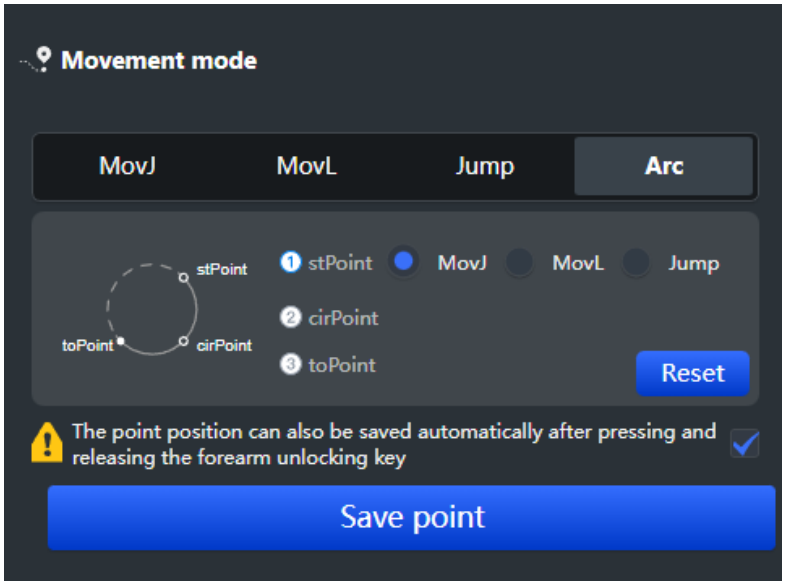



Figure 5.76 Arc point setting

After saving the intermediate and end points in sequence, you can see the following commands.

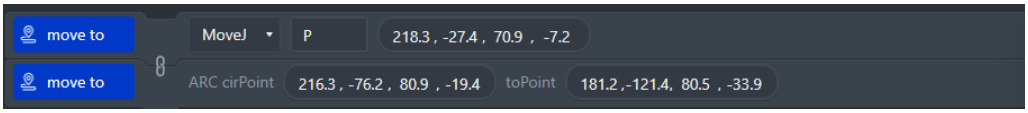



Figure 5.77 Arc point saving command

⚠NOTICE

Note the following rules when saving points to prevent the robotic arm from working outside its normal workspace.

- Any two points cannot coincide.
- The three points cannot be in the same straight line.
- The arc trajectory cannot exceed the normal workspace of Dobot Magician Lite.

**3. Pause time**

You can set the pause time after executing a command as required, and click + add.

**4. End-effector**

You can select the end tool to gripper or suction cup as required, and set its state: ON, OFF or STOP.

**5. Lost step check**

Lost step detection is used to detect whether a robotic arm loses step during operation. When lost step is detected, the robot arm will stop moving and the indicator light will turn red. The robot arm can run normally only after the lost step alarm is cleared and the robot arm returns to home point again. You can set the lost-step detection threshold as required and click + add.

**6. I/O trigger setting**

You can set the triggering mode to execute a command.

**7. Loop**

Click Loop 1 to set the number of times the commands run.

**Step 4** Click to run the commands.

**Step 5** (Optional) Click **File** > **Save**. Enter the project name and save the project to My Works.

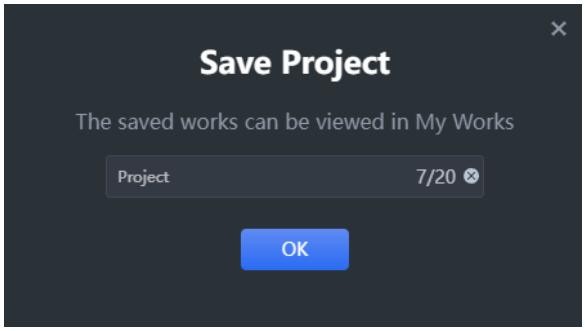



Figure 5.78 Save the project

**Step 6** (Optional) Click  to download the script to Magic Box. Before downloading, determine whether the robot arm returns to the home point before running offline. For detailed description on offline running, see “5.9Working in Offline Mode” for details.

## 5.8 Homing

When Magician Lite executes homing operation, it just returns to the home position without calibrating the accuracy. If Magician Lite has been hit or the motor has lost steps, you need to press the **Unlock** button on the forearm to restore the encoder value and improve the positioning accuracy.

**Prerequisites**

Dobot Magician Lite has been powered on, and connected to DobotLab.

**Procedure**

Click **Home** on the Arm Control Panel of DobotLab, as shown in Figure 5.79..

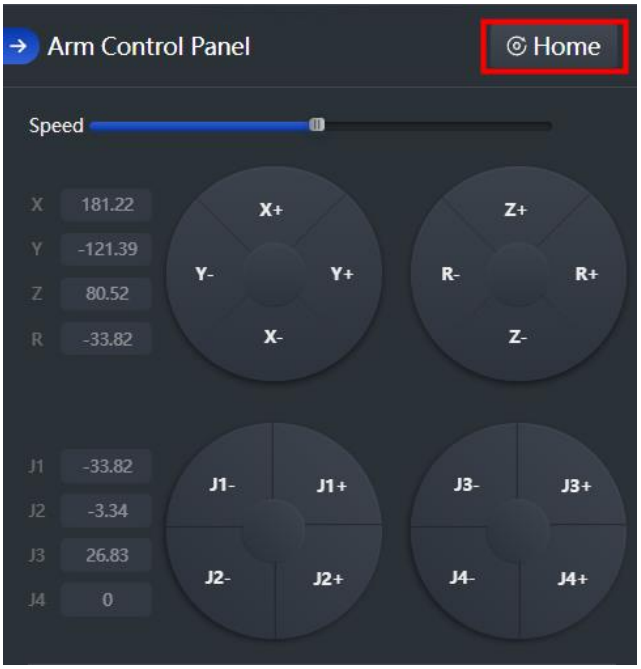



Figure 5.79 Click Home

⚠NOTICE

- Please remove the end-effector from Magician Lite before homing.
- Please ensure that there are no obstacles within the workspace during homing.

Magician Lite will rotate to the default homing point automatically and the LED indicator on the base flashes blue. After the homing is successful, there is a beep sound and the LED indicator turns green.

The homing point can also be user-defined. You can right-click a saved point in the command area of Teaching and Playback Lab and click **Set Home** to set this saved point as the homing point, as shown in Figure 5.80.

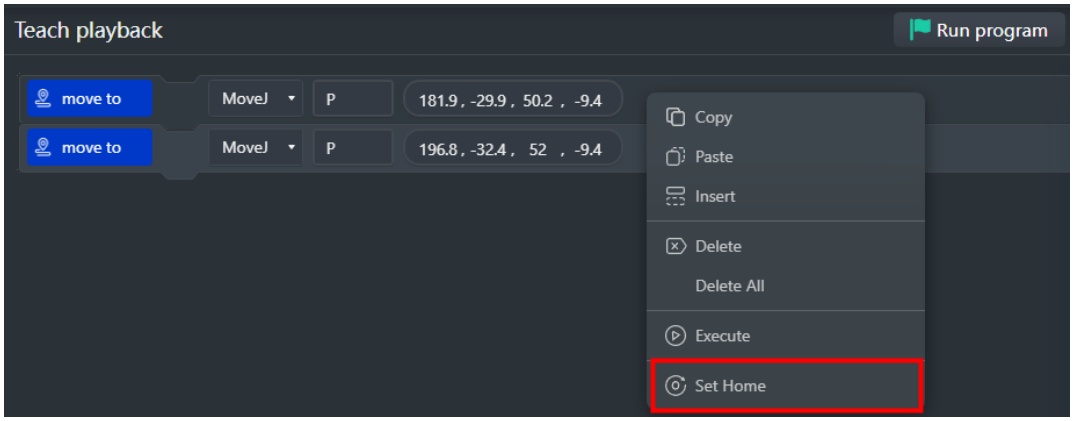



Figure 5.80 Set homing point

## 5.9 Working in Offline Mode

Offline mode allows the Magician Lite to perform the points in the Save points list that you have downloaded from DobotLab to Magic Box, without keeping the USB connection established.

**Prerequisites**

- Magic Box + Magician Lite has been powered on.
- Magic Box + Magician Lite has been connected to DobotLab.
- The points have been saved.

**Procedure**

**Step 1** After saving points in Teaching and Playback Lab, click . A prompt window on whether to return to the home point will pop up, as shown below.

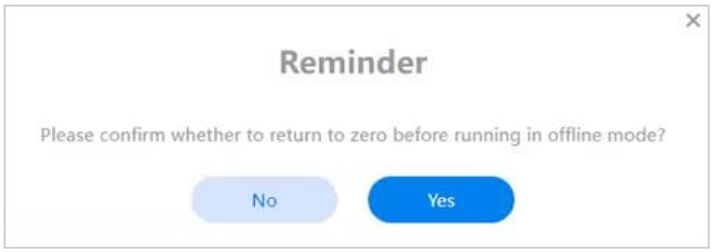



Figure 5.81 Confirm whether returning to the home point

**Step 2** Click **Yes** to download the Save points list.

You will see “The script has been downloaded to Magic Box successfully” on the screen when the downloading is completed.

**Step 3** Disconnect the Dobot Magician Lite from Dobotlab, or the USB cable between Magic Box and your computer.

**Step 4** Find the downloaded file under PlayBack module in Magic Box, and click the **OK** button on Magic Box to perform downloaded points., “Running” on the screen indicates that Magician Lite is executing the file in the offline mode.